

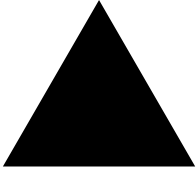
# Extreme Networks Consolidated Hardware Guide

Extreme Networks, Inc.  
3585 Monroe Street  
Santa Clara, California 95051  
(888) 257-3000  
<http://www.extremenetworks.com>

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For safety compliance information, see Appendix A.



# Contents

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## **Preface**

<b>Introduction</b>	<b>xix</b>
<b>Conventions</b>	<b>xx</b>
<b>Related Publications</b>	<b>xxi</b>
<b>About This Guide</b>	<b>xxi</b>
How To Use This Guide	xxii

## **Part 1: Common Features**

### **1 Summary of Common Switch Features**

<b>Software Images</b>	<b>1-1</b>
<b>Full-Duplex Support</b>	<b>1-2</b>
<b>Management Ports</b>	<b>1-2</b>
<b>Mini-GBIC Type and Hardware/Software Support</b>	<b>1-3</b>
Mini-GBIC Type and Specifications	1-3
Safety Information	1-4
Preparing to Install or Replace a Mini-GBIC	1-5
Installing and Removing a Mini-GBIC	1-5
<b>GBIC Type and Hardware/Software Support</b>	<b>1-7</b>
GBIC Types and Specifications	1-7
Determining Budget and Distance Calculations	1-10

Maximum Budget for Link Partners	1-11
Identifying ZX GBIC Rev 03 Modules	1-13
Safety Information	1-13
Installing or Replacing a GBIC	1-13

## **Part 2: Site Planning**

### **2 Site Preparation**

<b>Planning Your Site</b>	<b>2-2</b>
Step 1: Meeting Site Requirements	2-2
Step 2: Evaluating and Meeting Cable Requirements	2-2
Step 3: Meeting Power Requirements	2-2
<b>Meeting Site Requirements</b>	<b>2-3</b>
Operating Environment Requirements	2-3
Rack Specifications and Recommendations	2-12
<b>Evaluating and Meeting Cable Requirements</b>	<b>2-14</b>
Cabling Standards	2-15
Cable Labeling and Record Keeping	2-15
Installing Cable	2-15
RJ-45 Connector Jackets	2-19
Radio Frequency Interference	2-21
<b>Meeting Power Requirements</b>	<b>2-22</b>
Power Supply Requirements	2-22
AC Power Cord Requirements	2-23
Uninterruptable Power Supply Requirements	2-23
<b>Applicable Industry Standards</b>	<b>2-25</b>

## **Part 3: Summit Switch**

### **3 Summit Switch Overview**

<b>Summit Switch Models</b>	<b>3-1</b>
<b>Summary of Features</b>	<b>3-2</b>
Summit “i” series and non-“i” series switches	3-2

Summit24e2	3-3
Summit24e3	3-3
SummitPx1	3-4
<b>Memory Requirements</b>	<b>3-4</b>
Port Connections	3-5

## **4 Summit Switch Models**

<b>Switch Models</b>	<b>4-1</b>
<b>Summit1i Switch Front View</b>	<b>4-3</b>
GBIC Ports	4-4
<b>Summit1i Switch Rear View</b>	<b>4-4</b>
Power Sockets	4-4
Serial Number	4-5
MAC Address	4-5
Reset Button	4-5
Console Port	4-5
<b>Summit5i Switch Front View</b>	<b>4-6</b>
GBIC Ports	4-7
<b>Summit5i Switch Rear View</b>	<b>4-8</b>
Power Sockets	4-8
Serial Number	4-8
MAC Address	4-8
Reset Button	4-9
Console Port	4-9
Management Port	4-9
<b>Summit7i Switch Front View</b>	<b>4-10</b>
GBIC Ports	4-11
Reset Button	4-12
Console Port	4-12
Modem Port	4-12
Management Port	4-12
PCMCIA Slot	4-12
<b>Summit7i Switch Rear View</b>	<b>4-13</b>
Power Sockets	4-13

Serial Number	4-13
MAC Address	4-14
<b>Summit48i Switch Front View</b>	<b>4-15</b>
GBIC Ports	4-15
<b>Summit48i Switch Rear View</b>	<b>4-16</b>
Power Sockets	4-16
Serial Number	4-16
MAC Address	4-16
Reset Button	4-17
Console Port	4-17
<b>Summit48si Switch Front View</b>	<b>4-18</b>
Mini-GBIC Ports	4-18
Console Port	4-18
<b>Summit48si Switch Rear View</b>	<b>4-19</b>
Power Supplies	4-19
Reset Button	4-20
<b>Summit48si Switch Bottom View</b>	<b>4-20</b>
Serial Number	4-21
MAC Address	4-21
<b>Summit1i, Summit5i, Summit7i, Summit48i, and Summit48si Switch LEDs</b>	<b>4-22</b>
<b>Summit4 Switch Front View</b>	<b>4-23</b>
<b>Summit4/FX Switch Front View</b>	<b>4-24</b>
<b>Summit24 Switch Front View</b>	<b>4-25</b>
<b>Summit48 Switch Front View</b>	<b>4-26</b>
<b>Summit4, Summit24, and Summit48 Switch Rear View</b>	<b>4-27</b>
Power Socket	4-27
Serial Number	4-27
Console Port	4-27
Redundant Power Supply Port	4-27
MAC Address	4-28
Reset Button	4-28
<b>Summit4, Summit24, and Summit48 Switch LEDs</b>	<b>4-29</b>

<b>Summit24e2 Switch Front View</b>	<b>4-30</b>
Console Port	4-30
<b>Summit24e2 Switch Rear View</b>	<b>4-30</b>
Power Socket	4-30
<b>Summit24e2 Switch LEDs</b>	<b>4-31</b>
<b>Summit24e3 Switch Front View</b>	<b>4-32</b>
Mini-GBIC Ports	4-32
Console Port	4-32
Reset Button	4-32
<b>Summit24e3 Switch Rear View</b>	<b>4-33</b>
Power Socket	4-33
Serial Number	4-33
MAC Address	4-33
<b>Summit24e3 Switch LEDs</b>	<b>4-34</b>
<b>SummitPx1 Application Switch Front View</b>	<b>4-35</b>
GBIC Network Interface	4-35
Ethernet Management Port	4-35
Serial Management Console Port	4-36
Serial Management Modem Port	4-36
<b>SummitPx1 Application Switch Rear View</b>	<b>4-36</b>
Power Socket	4-36
Serial Number	4-36
MAC Address	4-37
<b>SummitPx1 Application Switch LEDs</b>	<b>4-37</b>
 <b>5 Summit Switch Installation</b>	
<b>Mounting the Switch in a Rack</b>	<b>5-1</b>
Placing the Switch on a Table or Shelf	5-4
<b>Removing and Installing Summit48si Power Supplies</b>	<b>5-4</b>
<b>Installing an AC Power Cord Retaining Bracket</b>	<b>5-6</b>
<b>Verifying a Successful Installation</b>	<b>5-8</b>

## **Part 4: Alpine Switch**

### **6 Alpine 3800 Series Switch Overview**

<b>Summary of Features</b>	<b>6-1</b>
Port Connections	6-3
<b>Switch Components</b>	<b>6-3</b>
Alpine 3808 Switch	6-4
Alpine 3804 Switch	6-4
Alpine 3802 Switch	6-4
Power Supply	6-5
<b>Safety Information</b>	<b>6-5</b>

### **7 Alpine 3800 Series Switch Chassis**

<b>Alpine 3800 Series Architecture</b>	<b>7-1</b>
Alpine 3808 Switch Front View	7-1
Alpine 3808 Switch Rear View	7-3
Alpine 3804 Switch Front View	7-4
Alpine 3804 Switch Rear View	7-6
Alpine 3802 Switch Front View	7-6
Alpine 3802 Switch Rear View	7-9
Alpine 3802 Software Enhancements	7-10
<b>Installing the Chassis</b>	<b>7-11</b>
Rack Installation	7-11
Grounding the Alpine 3800 Series Chassis	7-15
<b>Removing the Chassis</b>	<b>7-15</b>

### **8 Alpine 3800 Series Switch Power Supplies**

Power Supply LEDs	8-2
Verifying a Successful Installation	8-2
<b>Installing the Alpine 3800 Series AC Power Supply</b>	<b>8-3</b>
<b>Removing the Alpine 3800 Series AC Power Supply</b>	<b>8-5</b>
Servicing an Alpine 3802 AC Power Supply	8-6

	<b>Installing the Alpine 3800 Series DC Power Supply</b>	<b>8-7</b>
	Selecting the Cabling	8-7
	Installing the Power Supply	8-7
	Attaching the Cabling	8-11
	<b>Removing the Alpine 3800 Series DC Power Supply</b>	<b>8-11</b>
<b>9</b>	<b>Alpine 3800 Series Switch Management Module</b>	
	SMMi Memory	9-2
	SMMi LEDs	9-3
	<b>Installing SMMi Modules</b>	<b>9-3</b>
	Adding SODIMMs to the SMMi Module	9-4
	Removing SODIMMs from the SMMi Module	9-5
	<b>Removing SMMi Modules</b>	<b>9-5</b>
<b>10</b>	<b>Alpine 3800 Series I/O Modules</b>	
	<b>Configuring I/O Modules</b>	<b>10-1</b>
	GM-4Ti Module	10-3
	GM-4Xi Module	10-4
	GM-4Si Module	10-5
	GM-WDMi Module	10-6
	FM-32Ti Module	10-8
	FM-24Ti Module	10-9
	FM-24SFi Module	10-10
	FM-24MFi Module	10-11
	FM-8Vi Module	10-12
	WM-4T1i Module	10-15
	WM-4E1i Module	10-16
	WM-1T3i Module	10-17
	I/O Module LEDs	10-18
	Access I/O Module LEDs	10-18
	<b>Installing I/O Modules</b>	<b>10-19</b>
	<b>Removing I/O Modules</b>	<b>10-20</b>
<b>11</b>	<b>Alpine 3800 Series Switch Fan Tray</b>	
	Alpine 3808 Fan Tray	11-1

<b>Alpine 3804 Fan Tray</b>	<b>11-2</b>
<b>Alpine 3802 Fan Tray</b>	<b>11-2</b>
<b>Removing an Alpine 3808 or Alpine 3804 Fan Tray</b>	<b>11-3</b>
<b>Installing an Alpine 3808 or Alpine 3804 Fan Tray</b>	<b>11-5</b>

## **Part 5: BlackDiamond Switch**

### **12 BlackDiamond 6800 Series Switch Overview**

<b>Summary of Features</b>	<b>12-1</b>
Port Connections	12-3
<b>Switch Components</b>	<b>12-4</b>
BlackDiamond 6816 Switch	12-4
BlackDiamond 6808 Switch	12-4
BlackDiamond Power Supplies	12-5
Switch Connectivity and the Backplane	12-5
Packet Switching and Routing	12-6
<b>Following Safety Information</b>	<b>12-6</b>

### **13 BlackDiamond 6800 Series Switch Chassis**

<b>BlackDiamond 6800 Series Architecture</b>	<b>13-1</b>
BlackDiamond 6816 Switch Front View	13-1
BlackDiamond 6816 Switch Rear View	13-5
BlackDiamond 6808 Switch Front View	13-5
BlackDiamond 6808 Switch Rear View	13-7
<b>Installing the Chassis</b>	<b>13-8</b>
Rack Installation	13-8
<b>Removing the Chassis</b>	<b>13-11</b>

### **14 BlackDiamond 6800 Series Switch Power Supplies**

220 VAC Power Supplies	14-2
110 VAC Power Supplies	14-3

	DC Power Supplies	14-4
	<b>Installing a BlackDiamond 6800 Series Power Supply</b>	<b>14-5</b>
	AC Power Cable and Plug	14-8
	Selecting the DC Cabling	14-10
	Preparing the DC Cabling	14-10
	Attaching the DC Cabling	14-11
	Verifying a Successful Installation	14-12
	<b>Removing a BlackDiamond 6800 Series Power Supply</b>	<b>14-12</b>
<b>15</b>	<b>BlackDiamond 6800 Series Management Switch Module</b>	
	MSM64i Activity	15-3
	MSM64i Memory	15-4
	MSM64i LEDs	15-5
	<b>Installing MSM64i Modules</b>	<b>15-6</b>
	Adding SODIMMs to the MSM64i Module	15-8
	Removing a SODIMM from the MSM64i Module	15-9
	<b>Removing MSM64i Modules</b>	<b>15-9</b>
<b>16</b>	<b>BlackDiamond 6800 Series I/O Modules</b>	
	<b>Configuring I/O Modules</b>	<b>16-1</b>
	G8Ti Module	16-2
	G8Xi Module	16-3
	G12SXi Module	16-4
	WDMi Module	16-6
	F48Ti Module	16-8
	F96Ti Module	16-9
	F32F and F32Fi Modules	16-13
	P3cSi and P3cMi Modules	16-15
	P12cSi and P12cMi Modules	16-17
	ARM	16-19
	MPLS Module	16-21
	A3cSi Module	16-23
	I/O Module LEDs	16-24
	<b>Installing I/O Modules</b>	<b>16-25</b>
	<b>Removing I/O Modules</b>	<b>16-26</b>

<b>17</b>	<b>BlackDiamond 6800 Series Switch Fan Tray</b>	
	BlackDiamond 6816 Fan Trays	17-1
	BlackDiamond 6808 Fan Tray	17-2
	Removing a BlackDiamond 6800 Series Fan Tray	17-2
	Installing a BlackDiamond 6800 Series Fan Tray	17-4

## **Part 6: Switch Operation**

<b>18</b>	<b>Initial Switch and Management Access</b>	
	<b>Powering On the Switch</b>	<b>18-1</b>
	Powering On the Summit Switch	18-1
	Powering On the Alpine Switch	18-2
	Powering On the BlackDiamond Switch	18-2
	<b>Verifying the Installation</b>	<b>18-2</b>
	Verifying Successful Installation on the Summit Switch	18-2
	Verifying a Successful Installation on the Alpine Switch	18-2
	Verifying a Successful Installation on the BlackDiamond Switch	18-3
	<b>Connecting Equipment to the Console Port</b>	<b>18-3</b>
	<b>Logging In for the First Time</b>	<b>18-5</b>

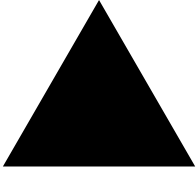
## **Part 7: Appendices**

<b>A</b>	<b>Safety Information</b>	
	<b>Important Safety Information</b>	<b>A-1</b>
	Power	A-1
	Power Cord	A-2
	Fuse	A-3
	Connections	A-3
	Lithium Battery	A-4

## **B Technical Specifications**

### **Index**





# Figures

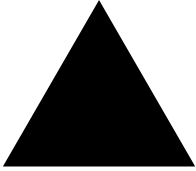
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<b>1-1</b>	Mini-GBIC module	1-6
<b>1-2</b>	Maximum budget for GBIC link partners	1-12
<b>1-3</b>	ZX GBIC optical system budget	1-12
<b>1-4</b>	GBIC modules	1-14
<b>2-1</b>	Air flow through the Alpine 3808 chassis	2-7
<b>2-2</b>	Air flow through the Alpine 3804 chassis	2-8
<b>2-3</b>	Air flow through the Alpine 3802 chassis	2-8
<b>2-4</b>	Air flow through the BlackDiamond 6816 chassis	2-9
<b>2-5</b>	Air flow through the BlackDiamond 6808 chassis	2-10
<b>2-6</b>	Ensure that you use an ESD wrist strap when handling switch components	2-11
<b>2-7</b>	Properly secured rack	2-14
<b>2-8</b>	Properly installed and bundled cable	2-17
<b>2-9</b>	Bend radius for fiber optic cable	2-18
<b>2-10</b>	RJ-45 connector jacket types	2-20
<b>4-1</b>	Front view of Summit1i switch with 100BASE-TX/ 1000BASE-T ports	4-3
<b>4-2</b>	Front view of Summit1i switch with 1000BASE-SX ports	4-3
<b>4-3</b>	Rear view of the Summit1i switch	4-4
<b>4-4</b>	Front view of Summit5i switch with 100BASE-TX/ 1000BASE-T ports	4-6
<b>4-5</b>	Front view of Summit5i switch with 1000BASE-SX ports	4-6
<b>4-6</b>	Front view of Summit5i switch with 1000BASE-LX ports	4-7
<b>4-7</b>	Rear view of the Summit5i switch	4-8
<b>4-8</b>	Front view of Summit7i switch with 100BASE-TX/ 1000BASE-T ports	4-10

<b>4-9</b>	Front view of Summit7i switch with 1000BASE-SX ports	4-11
<b>4-10</b>	Rear view of the Summit7i switch	4-13
<b>4-11</b>	Front view of Summit48i switch	4-15
<b>4-12</b>	Rear view of the Summit48i switch	4-16
<b>4-13</b>	Front view of Summit48si switch	4-18
<b>4-14</b>	Rear view of the Summit48si switch	4-19
<b>4-15</b>	Summit48si power supply	4-19
<b>4-16</b>	Bottom view of the Summit48si switch	4-21
<b>4-17</b>	Front view of the Summit4 switch	4-23
<b>4-18</b>	Front view of the Summit4/FX switch	4-24
<b>4-19</b>	Front view of the Summit24 switch	4-25
<b>4-20</b>	Front view of the Summit48 switch	4-26
<b>4-21</b>	Rear view of the Summit4, Summit24, and Summit48 switch	4-27
<b>4-22</b>	Front view of the Summit24e2 switch	4-30
<b>4-23</b>	Rear view of the Summit24e2 switch	4-30
<b>4-24</b>	Front view of the Summit24e3 switch	4-32
<b>4-25</b>	Rear view of the Summit24e3 switch	4-33
<b>4-26</b>	Front view of the SummitPx1 application switch	4-35
<b>4-27</b>	Rear view of the SummitPx1 application switch	4-36
<b>5-1</b>	Helper bracket for the Summit7i switch	5-2
<b>5-2</b>	An example of fitting the mounting bracket into the switch	5-3
<b>5-3</b>	Removing the retaining screws from the Summit48si power supply	5-5
<b>5-4</b>	Removing the Summit48si power supply	5-5
<b>5-5</b>	Attaching the retaining bracket to the power socket	5-6
<b>5-6</b>	Attaching two retaining brackets	5-7
<b>7-1</b>	Front view of the Alpine 3808 switch with sample I/O modules installed	7-3
<b>7-2</b>	Rear view of the Alpine 3808 switch	7-4
<b>7-3</b>	Front view of the Alpine 3804 switch with sample I/O modules installed	7-5
<b>7-4</b>	Rear view of the Alpine 3804 switch	7-6
<b>7-5</b>	Front view of the Alpine 3802 switch with sample I/O modules installed	7-7
<b>7-6</b>	Rear view of the Alpine 3802 switch	7-9
<b>7-7</b>	Helper bracket for mounting the Alpine 3800 series chassis	7-12
<b>7-8</b>	The Alpine 3808 chassis requires 8 screws to be securely mounted in a rack	7-13

<b>7-9</b>	The Alpine 3804 chassis requires 8 screws to be securely mounted in a rack	7-14
<b>7-10</b>	The Alpine 3802 chassis requires 4 screws to be securely mounted in a rack	7-14
<b>8-1</b>	AC power supply for the Alpine 3808 switch	8-4
<b>8-2</b>	AC power supply for the Alpine 3804 switch	8-4
<b>8-3</b>	DC power supply for the Alpine 3808 switch	8-8
<b>8-4</b>	DC power supply for the Alpine 3804 switch	8-8
<b>8-5</b>	Alpine 3808 DC power supply with cables attached	8-10
<b>8-6</b>	Alpine 3804 DC power supply with cables attached	8-10
<b>8-7</b>	2-stud -40 V and RTN lug, and 1-stud ground lug	8-11
<b>9-1</b>	Switch Management Module (SMMi)	9-1
<b>9-2</b>	SMMi SODIMM sockets	9-2
<b>9-3</b>	SMMi with open ejector/injector handles	9-3
<b>9-4</b>	Adding a SODIMM	9-4
<b>10-1</b>	GM-4Ti module	10-3
<b>10-2</b>	GM-4Xi module	10-4
<b>10-3</b>	GM-4Si module	10-5
<b>10-4</b>	GM-WDMi module	10-6
<b>10-5</b>	FM-32Ti module	10-8
<b>10-6</b>	FM-24Ti module	10-9
<b>10-7</b>	FM-24SFfi module	10-10
<b>10-8</b>	FM-24MFi module	10-11
<b>10-9</b>	FM-8Vi module	10-12
<b>10-10</b>	WM-4T1i module	10-15
<b>10-11</b>	WM-4E1i module	10-16
<b>10-12</b>	WM-1T3i module	10-17
<b>11-1</b>	Alpine 3808 fan tray	11-4
<b>11-2</b>	Alpine 3804 fan tray	11-4
<b>13-1</b>	Front view of the BlackDiamond 6816 switch with sample I/O modules	13-3
<b>13-2</b>	Rear view of the BlackDiamond 6816 switch	13-4
<b>13-3</b>	Front view of the BlackDiamond 6808 switch with sample I/O modules	13-6
<b>13-4</b>	Rear view of the BlackDiamond 6808 switch	13-7
<b>13-5</b>	Helper bracket for mounting a BlackDiamond 6800 series chassis	13-9
<b>13-6</b>	The BlackDiamond 6816 chassis requires 8 screws to be securely mounted in a rack	13-10

<b>13-7</b>	The BlackDiamond 6808 chassis requires 8 screws to be securely mounted in a rack	13-11
<b>14-1</b>	220 VAC power supplies in a BlackDiamond 6808	14-2
<b>14-2</b>	110 VAC power supplies in a BlackDiamond 6808	14-3
<b>14-3</b>	DC power supplies in a BlackDiamond 6808	14-4
<b>14-4</b>	Installing a DC power supply in a BlackDiamond 6816	14-6
<b>14-5</b>	Installing an AC power supply in a BlackDiamond 6808	14-7
<b>14-6</b>	Installing a second power supply in a BlackDiamond 6808	14-8
<b>14-7</b>	BlackDiamond 220 VAC power cable and plug	14-9
<b>14-8</b>	BlackDiamond 110 VAC power cable and plug	14-9
<b>14-9</b>	Dimensions of the DC power cable lugs	14-10
<b>14-10</b>	2-stud lug	14-11
<b>14-11</b>	Removing BlackDiamond 6816 DC power supplies	14-13
<b>14-12</b>	Removing BlackDiamond 6808 220 VAC power supplies	14-14
<b>15-1</b>	Management Switch Fabric Module 64 (MSM64i)	15-2
<b>15-2</b>	MSM64i SODIMM sockets	15-4
<b>15-3</b>	MSM64i prior to insertion in BlackDiamond 6816	15-6
<b>15-4</b>	MSM64i prior to insertion in BlackDiamond 6808	15-7
<b>15-5</b>	Adding a SODIMM	15-9
<b>16-1</b>	G8Ti module	16-2
<b>16-2</b>	G8Xi module	16-3
<b>16-3</b>	G12SXi module	16-4
<b>16-4</b>	WDMi module	16-6
<b>16-5</b>	F48Ti module	16-8
<b>16-6</b>	F96Ti module	16-9
<b>16-7</b>	One RJ-21 connector yields 12 10/100 ports	16-10
<b>16-8</b>	F32F and F32Fi modules	16-13
<b>16-9</b>	P3cSi and P3cMi modules	16-15
<b>16-10</b>	P12cSi and P12cMi modules	16-17
<b>16-11</b>	Accounting and Routing Module	16-19
<b>16-12</b>	MultiProtocol Label Switching (MPLS) module	16-21
<b>16-13</b>	A3cSi module	16-23
<b>17-1</b>	Removing the BlackDiamond 6816 fan tray	17-3
<b>17-2</b>	Removing the BlackDiamond 6808 fan tray	17-4
<b>18-1</b>	Null-modem cable pinouts	18-4
<b>18-2</b>	PC-AT serial null-modem cable pinouts	18-5

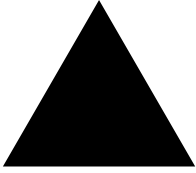


# Tables

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<b>1</b>	Notice Icons	<b>xx</b>
<b>2</b>	Text Conventions	<b>xx</b>
<b>1-1</b>	Power LED Activity for Switches Running ExtremeWare Version 6.2 or Later	1-2
<b>1-2</b>	SX Mini-GBIC Specifications	1-3
<b>1-3</b>	LX Mini-GBIC Specifications	1-4
<b>1-4</b>	GBIC Types and Maximum Distances	1-7
<b>1-5</b>	1000BASE-SX Specifications	1-8
<b>1-6</b>	1000BASE-LX Specifications	1-8
<b>1-7</b>	1000BASE-ZX Specifications	1-9
<b>1-8</b>	1000BASE-ZX Rev 03 Specifications	1-9
<b>1-9</b>	1000BASE-LX70 Specifications	1-10
<b>1-10</b>	Cable Attenuation and Distances for the ZX GBIC	1-11
<b>1-11</b>	Cable Attenuation and Distances for the LX70 GBIC	1-11
<b>2-1</b>	Media Types and Maximum Distances	2-18
<b>2-2</b>	AC Power Cord Requirements	2-23
<b>3-1</b>	Port Configurations on All Summit Switch Models	3-6
<b>4-1</b>	Switch LED Activity for the Summit48si	4-20
<b>4-2</b>	Switch LED Activity for the Summit11i, Summit5i, Summit7i, Summit48i, and Summit48si	4-22
<b>4-3</b>	Switch LED Activity for the Summit4, Summit24, and Summit48	4-29
<b>4-4</b>	Summit24e2 Switch LED Activity	4-31
<b>4-5</b>	Summit24e3 Switch LED Activity	4-34
<b>4-6</b>	SummitPx1 Application Switch LED Activity	4-37
<b>6-1</b>	Port Configurations Available on Alpine I/O Modules	6-3

<b>6-2</b>	Supported Power Supplies for the Alpine 3800 Series Switch	6-5
<b>7-1</b>	Alpine 3802 Switch LEDs	7-8
<b>8-1</b>	Supported Power Supplies for the Alpine 3800 Series Switch	8-2
<b>8-2</b>	Alpine 3808 and Alpine 3804 Power Supply LED	8-2
<b>8-3</b>	Alpine 3802 Power Supply LEDs	8-2
<b>9-1</b>	SMMi LEDs	9-3
<b>10-1</b>	GM-WDMi Optical Interface Specifications	10-6
<b>10-2</b>	GM-WDMi Maximum Transmit Distances	10-7
<b>10-3</b>	RJ-21 Connector and Wire Pairs	10-13
<b>10-4</b>	Alpine I/O Module LEDs	10-18
<b>10-5</b>	Access I/O Module LEDs	10-18
<b>12-1</b>	Port Configurations Available on BlackDiamond I/O Modules	12-3
<b>14-1</b>	LEDs on the 220 VAC Power Supply	14-3
<b>14-2</b>	110 VAC Power Supply LED Activity	14-4
<b>14-3</b>	DC Power Supply LED Activity	14-5
<b>14-4</b>	Source DC Power specifications	14-11
<b>15-1</b>	Packet Throughput Between I/O Modules	15-1
<b>15-2</b>	MSM64i SODIMM Memory Combinations	15-5
<b>15-3</b>	MSM64i LEDs	15-5
<b>16-1</b>	WDMi Optical Interface Specifications	16-7
<b>16-2</b>	WDMi Maximum Transmit Distances	16-7
<b>16-3</b>	Connector Pinouts for the RJ-21 Connector	16-10
<b>16-4</b>	Output Signals for the RJ-21 Connector	16-11
<b>16-5</b>	F96Ti Cable Specifications	16-12
<b>16-6</b>	Optical Interface Specifications for the P3cSi and P3cMi	16-16
<b>16-7</b>	Optical Interface Specifications for the P12cSi and P12cMi	16-18
<b>16-8</b>	BlackDiamond I/O Module LEDs	16-24
<b>18-1</b>	Pinouts for the Console Connector	18-4
<b>B-1</b>	Summit “i” series Switch Specifications	B-2
<b>B-2</b>	Summit non-“i” series Switch Specifications	B-5
<b>B-3</b>	Summit24e2 Switch Specifications	B-6
<b>B-4</b>	Summit24e3 Switch Specifications	B-7
<b>B-5</b>	SummitPx1 Application Switch Specifications	B-8
<b>B-6</b>	Alpine 3800 series Switch Specifications	B-9
<b>B-7</b>	BlackDiamond 6800 series Switch Specifications	B-11
<b>B-8</b>	Common Switch Specifications	B-13



# Preface

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This preface provides an overview of this guide, describes guide conventions, and lists other publications that might be useful.



*Note: To ensure proper operation of your Extreme Networks equipment, read this guide before you install any Extreme Networks equipment.*

## Introduction

This guide provides the required information to install an Extreme Networks Summit™ switch, Alpine™ switch, or BlackDiamond® switch. It also contains information about site location, switch functionality, and switch operation.

This guide is intended for use by network administrators who are responsible for installing and setting up network equipment. It assumes a basic working knowledge of:

- Local Area Networks (LANs)
- Ethernet concepts
- Ethernet switching and bridging concepts
- Routing concepts
- Simple Network Management Protocol (SNMP)

See the *ExtremeWare Software User Guide* for information about configuring an Extreme Networks switch.



*Note: If the information in the Release Notes that shipped with your switch differs from the information in this guide, follow the Release Notes.*

# Conventions

Table 1 and Table 2 list conventions used throughout this guide.

Table 1: Notice Icons

Icon	Notice Type	Alerts you to...
	Note	Important features or instructions.
	Caution	Risk of personal injury, system damage, or loss of data.
	Warning	Risk of severe personal injury.

Table 2: Text Conventions

Convention	Description
Screen displays	This typeface represents information as it appears on the screen, or command syntax.
<b>Screen displays bold</b>	This typeface represents commands that you type.
The words “enter” and “type”	When you see the word “enter” in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says “type.”
[Key] names	Key names appear in text in one of two ways: <ul style="list-style-type: none"><li>■ Referenced by their labels, such as “the Return key” or “the Escape key”</li><li>■ Written with brackets, such as [Return] or [Esc]</li></ul> If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press [Ctrl]+[Alt]+[Del].
Words in <i>italicized type</i>	Italics emphasize a point of information or denote new terms at the place where they are defined in the text.

## Related Publications

The Extreme Networks switch documentation set includes:

- *Extreme Networks Consolidated Hardware Guide* (this guide)
- *ExtremeWare Software User Guide*
- *ExtremeWare Quick Reference Guide*
- *ExtremeWare Release Notes*

Documentation for Extreme Networks products is available from the Extreme Networks web site at the following location:

<http://www.extremenetworks.com/support/techsupport.asp>

You can select and download the following Extreme Networks documentation from the Technical Documentation section of the Technical Support page:

- Hardware
- Software
- Instructional Videos
- Archives

You can also purchase Extreme Networks documentation from the Extreme Networks web site.

## About This Guide

This guide describes how to prepare your site and how to install, maintain, and operate your Extreme Networks switch. It contains information on features that are common to all switches, as well as switch-specific features. This guide is divided into seven parts:

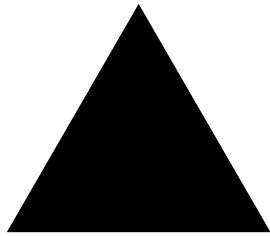
- **Common Features**—Describes features that are shared by the Extreme Networks family of switches. This section describes software images, full duplex support, management ports, mini-GBIC and GBIC modules and their installation.
- **Site Planning**—Describes how to evaluate, plan, and determine the location of your Extreme Networks switch.

- **Summit Switch**—Describes the features that are specific to the Summit switch. This section provides an overview of the Summit switch, information about model types, summary of features, and installation guidelines.
- **Alpine Switch**—Describes the features that are specific to the Alpine switch. This section provides an overview of the Alpine switch, information about model types, a summary of features, and installation guidelines.
- **BlackDiamond Switch**—Describes the features that are specific to the BlackDiamond switch. This section provides an overview of the Alpine switch, information about model types, a summary of features, and installation guidelines.
- **Switch Operation**—Describes how to power on any Extreme Networks switch, verify the switch installation, connect equipment to the console port, and log in to the switch for the first time.
- **Appendices**—Includes information about safety requirements and technical specifications.

## How To Use This Guide

Each chapter of this guide contains information on how to successfully operate your Extreme Networks switch. The Summit-, Alpine-, and BlackDiamond-specific chapters contain information that is applicable to that family of switch only. All other chapters are applicable to any Extreme Networks switch. For switch-specific information, be sure to read the applicable switch-specific chapter. For example, if you have a BlackDiamond switch and you need to remove and replace an I/O module, see “Removing I/O Modules” in Chapter 16 for details about how to remove and replace an I/O module in a BlackDiamond chassis. For an issue that is applicable to any Extreme Networks switch, make sure you read the appropriate chapter. For example, after your switch is properly installed, powered on and passes its initial power-on self test (POST), you need to log in to the switch for the first time. See “Logging In for the First Time” in Chapter 18 for details about how to log in to the switch for the first time.

The appendices describe switch safety issues and switch specifications. The Safety Information appendix describes important safety issues such as power, power cords, and fuses. The Technical Specifications appendix is organized according to the family of switch: Summit, Alpine, and BlackDiamond, and describes switch specifications such as physical dimensions, weight, certifications, and power supply parameters. Information that is common to all switches is described at the end of the appendix.



Part 1:

Common Features

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# Summary of Common Switch Features

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This chapter describes the features that are shared in common by the Extreme Networks family of switches. The following topics are described in greater detail:

- Software Images on page 1-1
- Full-Duplex Support on page 1-2
- Management Ports on page 1-2
- Mini-GBIC Type and Hardware/Software Support on page 1-3
- GBIC Type and Hardware/Software Support on page 1-7

## Software Images

When you receive a new Extreme Networks switch, be aware that an the ExtremeWare™ software image has been preinstalled at the factory. To verify the software image you are running on your switch, use the `show version` command. The `show version` command displays the hardware and software versions currently running on the switch. To ensure that you have the latest software image, go to the Extreme Networks support website at <http://www.extremenetworks.com/support/scopus.asp> and download the latest software image.

If your switch is running release of ExtremeWare version 6.2 or later, the Power LED activity is different from previous versions of ExtremeWare. All other LED activity is the same. See Table 1-1 for more information about the Power LED activity on switches running ExtremeWare version 6.2 or later.

**Table 1-1:** Power LED Activity for Switches Running ExtremeWare Version 6.2 or Later

LED	Color	Indicates
Power LED	Green	The indicated power supply unit (PSU) is powered up.
	Amber	A PSU is installed, but not connected to power.
	Off	The PSU is not receiving power or no PSU is present.



*Note: If the information in the Release Notes that shipped with your switch differs from the information in this guide, follow the Release Notes.*

## Full-Duplex Support

Extreme Networks switches provide full-duplex support for all ports. This means that frames can be transmitted and received simultaneously, which, in effect, doubles the bandwidth available that is available on a link. Most ports on an Extreme Networks switch autonegotiate for half-duplex or full-duplex operation. Gigabit Ethernet and 100BASE-FX ports operate in full-duplex mode only in accordance with technical standards.

## Management Ports

The 10/100BASE-TX Ethernet management port allows you to communicate directly to the CPU of the switch. You can plug an Ethernet cable directly from your laptop into the management port. This provides you with direct access into the switch and allows you to view and locally manage the switch configurations.

The management port is located on the following Extreme Networks devices:

- Summit5i—The management port is located on the back side of the switch
- Summit7i —The management port is located on the front side of the switch
- Alpine—Switch Management Module (SMMi) for the Alpine series switch
- BlackDiamond—Management Switch Fabric Module (MSM64i) for the BlackDiamond series switch

It is possible, but not recommended, to route traffic from the management port to any front panel port on the switch. The management port is designed for switch management purposes.

## Mini-GBIC Type and Hardware/Software Support

The Summit24e3 and Summit48si switches support the small form pluggable SFP GBIC, also known as the mini-GBIC. The switch uses identifier bits to determine the media type of the mini-GBIC that is installed.

### Mini-GBIC Type and Specifications

There are two types of mini-GBIC interfaces:

- SX mini-GBIC, which conforms to the 1000BASE-SX standard
- LX mini-GBIC, which conforms to the 1000BASE-LX standard

Use only Extreme Networks-certified mini-GBICs, available from Extreme Networks, into the mini-GBIC port in the switch.

Table 1-2 describes the specifications for the SX mini-GBIC interface, and Table 1-3 describes the specifications for the LX mini-GBIC interface.

**Table 1-2:** SX Mini-GBIC Specifications

Parameter	Minimum	Typical	Maximum
<b>Transceiver</b>			
Optical output power	-9.5 dBm		-4 dBm
Center wavelength	830 nm	850 nm	860 nm
<b>Receiver</b>			
Optical input power sensitivity	-21 dBm		
Optical input power maximum			-4 dBm
Operating wavelength	830 nm		860 nm
<b>General</b>			
Total system budget			11.5 dBm

Total optical system budget for the SX mini-GBIC is 11.5 dBm. Extreme Networks recommends that 3 dBm of the total budget be reserved for losses induced by cable

splices/connectors and operating margin. While 8.5 dBm remains available for cable induced attenuation, the 1000Base-SX standard specifies supported distances of 275 meters over 62.5 micron multimode fiber and 550 meters over 50 micron multimode fiber. There is no minimum attenuation or minimum cable length restriction.

**Table 1-3: LX Mini-GBIC Specifications**

Parameter	Minimum	Typical	Maximum
<b>Transceiver</b>			
Optical output power	-9.5 dBm		-3 dBm
Center wavelength	1275 nm	1310 nm	1355 nm
<b>Receiver</b>			
Optical input power sensitivity	-23 dBm		
Optical input power maximum			-3 dBm
Operating wavelength	1270 nm		1355 nm
<b>General</b>			
Total system budget			13.5 dBm

Total optical system budget for the LX mini-GBIC is 13.5 dBm. Measure cable plant losses with a 1310 nm light source and verify this to be within budget. When calculating the maximum distance attainable using optical cable with a specified loss per kilometer (for example 0.25 dB/km) Extreme Networks recommends that 3 dBm of the total budget be reserved for losses induced by cable splices/connectors and operating margin. Thus, 10.5 dBm remains available for cable induced attenuation. There is no minimum system budget or minimum cable length restriction because the maximum receive power is the same as the maximum transmit power. There is no minimum attenuation or minimum cable length restriction.

## Safety Information

Before you begin the process of installing or replacing a mini-GBIC, read the safety information in this section.



*Caution: Mini-GBICs can emit invisible laser radiation. Avoid direct eye exposure to beam.*

Mini-GBICs are class 1 laser devices. Use only Extreme-approved devices.



*Note: If you see an amber blinking mini-GBIC port status LED after you install a mini-GBIC into the Summit24e3 or Summit48si switch, this means the mini-GBIC is not certified by Extreme Networks. To correct this problem, install an Extreme Networks certified mini-GBIC, available from Extreme Networks, into the port in the switch.*

## Preparing to Install or Replace a Mini-GBIC

To ensure proper installation, complete the following tasks before inserting the mini-GBIC:

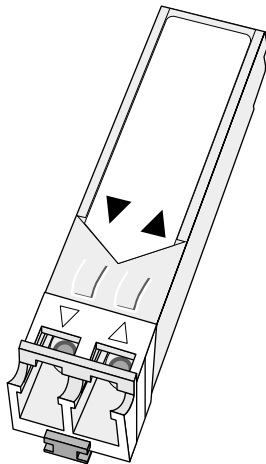
- Disable the port that is needed to install or replace the mini-GBIC.
- Inspect and clean the fiber tips, coupler, and connectors.
- Prepare and clean an external attenuator, if needed.
- Do not stretch the fiber.
- Make sure the bend radius of the fiber is not less than 2 inches (5.08 cm).

When installing or replacing mini-GBICs on an active network, use the same type of mini-GBIC at each end of the link.

Once you complete all of these tasks, you are ready to install or replace a mini-GBIC.

## Installing and Removing a Mini-GBIC

You can add and remove mini-GBICs from your Summit24e3 switch without powering off the system. Figure 1-1 shows the mini-GBIC connector.



XM\_032

**Figure 1-1:** Mini-GBIC module

Mini-GBICs are Class 1 laser devices. Use only Extreme-approved devices.



*Note: Remove the LC fiber-optic connector from the mini-GBIC prior to removing the mini-GBIC from the switch.*



*Caution: Mini-GBICs can emit invisible laser radiation. Avoid direct eye exposure to beam.*



*Note: If you see an amber blinking mini-GBIC port status LED after you install a mini-GBIC into the Summit24e3 or Summit48si switch, this means the mini-GBIC is not certified by Extreme Networks. To correct this problem, install an Extreme Networks certified mini-GBIC, available from Extreme Networks, into the port in the switch.*

To remove the mini-GBIC connector, gently depress and hold the black plastic tab at the bottom of the connector and pull the mini-GBIC out of the port on the switch.

To insert a mini-GBIC connector:

- 1** Holding the mini-GBIC by its sides, insert the mini-GBIC into the port on the switch. The black plastic tab is at the bottom of the connector.
- 2** Slide the mini-GBIC into the port, until you hear it click.

# GBIC Type and Hardware/Software Support

Most Extreme Networks switches support two types of GBICs: the Parallel ID GBIC and the Serial ID GBIC. The switch uses identifier bits to determine the media type for the GBIC that is installed. Initial ExtremeWare software versions do not support Serial ID GBICs. If Serial ID GBICs are installed in a switch with an initial software release, the switch will not bring up the link on GBIC ports.

## GBIC Types and Specifications

Table 1-4 describes the GBIC types and distances for the different types of Extreme Networks series switch ports. Table 1-5 through Table 1-9 describe the different GBIC specifications.

**Table 1-4:** GBIC Types and Maximum Distances

Standard	Media Type	Mhz•Km Rating	Maximum Distance (Meters)
1000BASE-SX (850 nm optical window)	50/125 µm multimode fiber	400	500
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	160	220
	62.5/125 µm multimode fiber	200	275
1000BASE-LX (1310 nm optical window)	50/125 µm multimode fiber	400	550
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	500	550
	10/125 µm single-mode fiber	—	5,000
1000BASE-ZX (1550 nm optical window)	10/125 µm single-mode fiber*	—	10,000
	10/125 µm single-mode fiber	—	50,000
	10/125 µm single-mode fiber	—	70,000
	10/125 µm single-mode fiber	—	70,000

**Table 1-4:** GBIC Types and Maximum Distances (continued)

Standard	Media Type	Mhz•Km Rating	Maximum Distance (Meters)
100BASE-FX (1300 nm optical window)	50/125 µm multimode fiber	400	2000
	50/125 µm multimode fiber	500	2000
	62.5/125 µm multimode fiber	400	2000
	62.5/125 µm multimode fiber	500	2000
1000BASE-T	Category 5 and higher UTP cable	–	100
100BASE-TX	Category 5 and higher UTP cable	–	100
10BASE-T	Category 3 and higher UTP cable	–	100

\*Extreme Networks proprietary. Connections between two Extreme Networks 1000BASE-LX interfaces can use a maximum distance of 10,000 meters.

**Table 1-5:** 1000BASE-SX Specifications

Parameter	Minimum	Typical	Maximum
<b>Transceiver</b>			
Optical output power	-9.5 dBm	-9.5 dBm	-5 dBm*
Center wavelength	830 nm	850 nm	860 nm
<b>Receiver</b>			
Optical input power sensitivity	-17 dBm		
Optical input power maximum			-0 dBm
Operating wavelength	830 nm		860 nm

\*The transmitter output power level for the 1000BASE-SX is -5 dBm. The maximum allowable receiver input power level is -17 dBm. Therefore, there is a minimum of 12 dB loss required for the link to operate without errors. This minimum required loss can be achieved using a fiber length of 52 km (0.25 dB/km provides 8 dB loss), or by adding 10 dB of fixed optical attenuator at the receiver end.

**Table 1-6:** 1000BASE-LX Specifications

Parameter	Minimum	Typical	Maximum
<b>Transceiver</b>			
Optical output power	-9.5 dBm	-11.5 dBm	-3 dBm
Center wavelength	1285 nm	1310 nm	1343 nm
<b>Receiver</b>			
Optical input power sensitivity	-20 dBm		

**Table 1-6:** 1000BASE-LX Specifications (continued)

Parameter	Minimum	Typical	Maximum
Optical input power maximum			-3 dBm
Operating wavelength	1285 nm		1343 nm

**Table 1-7:** 1000BASE-ZX Specifications

Parameter	Minimum	Typical	Maximum
<b>Transceiver</b>			
Optical output power	-4 dBm	-3 dBm	-1 dBm
Center wavelength	1540 nm	1550 nm	1570 nm
<b>Receiver</b>			
Optical input power sensitivity	-23.5 dBm		
Optical input power maximum			-1 dBm
Operating wavelength	1540 nm	1550 nm	1570 nm

**Table 1-8:** 1000BASE-ZX Rev 03 Specifications

Parameter	Minimum	Typical	Maximum
<b>Transceiver</b>			
Optical output power	-2 dBm	0 dBm	2 dBm
Center wavelength	1540 nm	1550 nm	1570 nm
<b>Receiver</b>			
Optical input power sensitivity	-23 dBm		
Optical input power maximum			-1 dBm
Operating wavelength	1540 nm	1550 nm	1570 nm

Measure cable plant losses with a 1550 nm light source and verify this to be within budget. When calculating the maximum distance attainable using optical cable with a specified loss per kilometer (for example 0.25 dB/km), Extreme Networks recommends that 3 dB of the total budget be reserved for losses induced by cable splices/connectors and operating margin. Thus, 18 dB remains available for cable induced attenuation.

A minimum attenuation of 3 dB is required to prevent saturation of the receiver.

If a ZX GBIC is used on the same link with an LX70 GBIC, the available link budget is reduced to a total of 18 dB. Additionally, a minimum attenuation of 6 dB is required to ensure correct operation of the ZX GBIC receiver.

**Table 1-9:** 1000BASE-LX70 Specifications

Parameter	Minimum	Typical	Maximum
<b>Transceiver</b>			
Optical output power	0 dBm	3 dBm	4 dBm*
Center wavelength	1540 nm	1550 nm	1560 nm
<b>Receiver</b>			
Optical input power sensitivity	-24 dBm		
Optical input power maximum			-3 dBm
Operating wavelength	1200 nm		1560 nm

\*The transmitter output power level for the 1000BASE-LX70 is +4 dBm. The maximum allowable receiver input power level is -3 dBm. Therefore, there is a minimum of 7 dB loss required for the link to operate without errors. This minimum required loss can be achieved using a fiber length of 32 km (0.25 dB/km provides 8 dB loss), or by adding 10 dB of fixed optical attenuator at the receiver end.

## Determining Budget and Distance Calculations

When calculating the distance that is attainable by using optical cable with a specified loss per kilometer, Extreme Networks recommends that 3 dB of the total budget be reserved for losses that are induced by cable splices, cable connectors, and operating margin. These are referred to as *loss penalties*.

To determine the required link budget for a specific distance of fiber, use the following formula:

Required Link Budget LB = [(Distance d) \* (Fiber Attn)] + all other Loss Penalties

- Distance is the distance between the links
- Fiber attenuation is the fiber or cable attenuation
- loss penalties are the amounts reserved for losses that are induced by cable splices, cable connectors, and operating margin.

The following example determines a required link budget of 9 dB where the following is true:

- Distance is 20 km
- Fiber attenuation is 0.30 dB/km
- Loss penalties are 3 dB

Required Link Budget LB = (20 km \* 0.30 dB/km) + 3 dB = 9 dB

When calculating the supported link distance, if the link distance is less than the minimum length supported, external attenuators may be needed. To determine the supported link distance, use the following formula:

Link distance supported = (system budget - loss penalties) / fiber attenuation

For example, Table 1-10 and Table 1-11 use the supported link distance formula to determine the maximum link distances for two different GBICs: the ZX GBIC and the LX70 GBIC.

**Table 1-10:** Cable Attenuation and Distances for the ZX GBIC

Cable Attenuation	Minimum Distance	Maximum Distance
0.30 dB/km	0 km	(19.5-3)/0.30 = 55 km
0.25 dB/km	0 km	(19.5-3)/0.25 = 66 km
0.23 dB/km	0 km	(19.5-3)/0.23 = 71 km

**Table 1-11:** Cable Attenuation and Distances for the LX70 GBIC


Cable Attenuation	Minimum Distance	Maximum Distance
0.30 dB/km	27 km	(22-3)/0.30 = 63 km
0.25 dB/km	33 km	(22-3)/0.25 = 76 km
0.23 dB/km	36 km	(22-3)/0.23 = 82 km

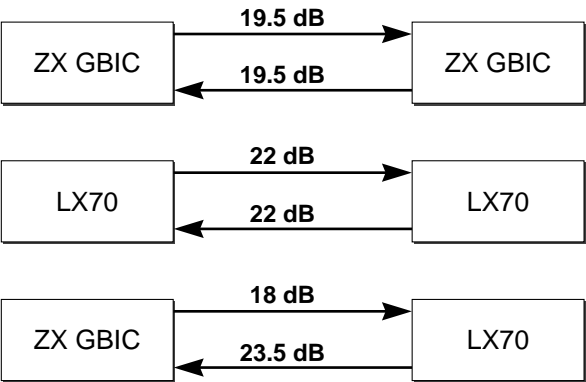
## Maximum Budget for Link Partners

Figure 1-2 displays the maximum budget for the following GBIC link partners:

- Older ZX GBIC and Older ZX GBIC
- LX70 GBIC and LX70 GBIC
- ZX GBIC and LX70 GBIC

Do not use ZX or LX70 GBICs with the 1000BASE LX GBIC. The 1000BASE LX GBIC uses a wavelength of 1310 nm. The ZX and LX70 GBIC receivers are not specified to operate at this wavelength. Do not use the LX70 GBIC with the ZX GBIC.

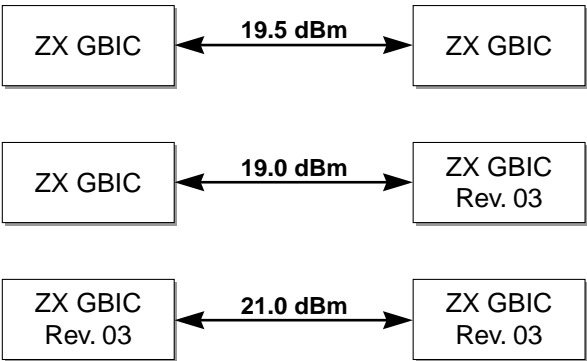
 *Note: The fiber loss budget plus all other penalties must not exceed the total system budget.*



XM\_001

**Figure 1-2:** Maximum budget for GBIC link partners

Figure 1-3 shows the total optical system budget between older ZX GBICs and the ZX GBIC Rev 03.



XM\_038

**Figure 1-3:** ZX GBIC optical system budget

## Identifying ZX GBIC Rev 03 Modules

To identify the type of ZX GBIC module you have, look at the label on the top of the ZX GBIC module. If you see one of the following on the label, you have a ZX GBIC Rev 03 module:

- DVA-1203 sticker near the top of the label that covers the Extreme Networks logo
- ZX GBIC (1203) wording near the top of the label
- ZX GBIC Rev 03 wording near the center of the label

## Safety Information

Before you install or replace a GBIC, read the safety information in this section.



*Caution: GBICs can emit invisible laser radiation. Avoid direct eye exposure to beam.*

GBICs are class 1 laser devices. Use only Extreme-approved devices.

Remove the SC fiber-optic connector from the GBIC prior to removing the GBIC from the I/O module or the switch.

## Installing or Replacing a GBIC

This section describes the preparation steps that you must perform before inserting and securing a GBIC.



*Caution: GBICs can emit invisible laser radiation. Avoid direct eye exposure to beam.*

To ensure proper installation, complete the following tasks before inserting the GBIC:

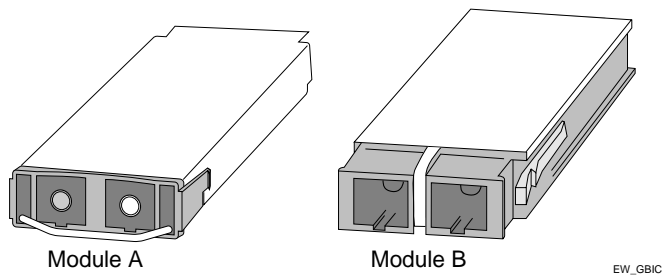
- Inspect and clean the fiber tips, coupler, and connectors.
- Prepare and clean an external attenuator, if needed.
- Calculate the link budget.
- Do not stretch the fiber.
- Make sure the bend radius of the fiber is not less than 2 inches.

In addition to the previously described tasks, Extreme Networks recommends the following when installing or replacing GBICs on an active network:

- Use the same type of GBIC at each end of the link.
- Connect one end of the link to the Tx port. Without an attenuator, measure the total loss from the Tx port to the other site of the link. For example, the total loss must not exceed the total budget listed in Table 1-10 for a ZX GBIC or Table 1-11 for an LX70 GBIC.
- Use dispersion shifted fiber whenever possible. This provides superior performance in the 1550 nm range.

Once you complete all of these described tasks, you are ready to install or replace a GBIC.

You can add and remove GBICs from your Extreme Networks switch without powering off the system. Figure 1-4 shows the two types of GBIC connectors.



**Figure 1-4:** GBIC modules

GBICs are a Class 1 laser device. Use only Extreme-approved devices.



*Note: Remove the SC fiber-optic connector from the GBIC prior to removing the GBIC from the I/O module or the switch.*



*Caution: GBICs can emit invisible laser radiation. Avoid direct eye exposure to beam.*

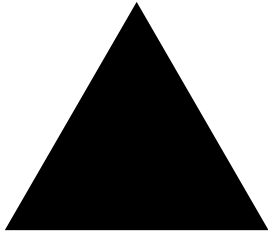
To remove the GBIC connector labeled “Module A,” lift up on the front handle and pull the GBIC out of the slot.

To remove the GBIC connector labeled “Module B,” gently squeeze the sides to release it, and pull the GBIC out of the slot.

To insert a GBIC connector:

- 1** Holding the GBIC by its sides, insert the GBIC into the slot on the I/O module or the switch.
- 2** Slide the GBIC into the slot, until you hear it click.
- 3** If the GBIC has a handle, push down on the handle to secure the GBIC.





## Part 2: Site Planning

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# Site Preparation

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This chapter describes how to prepare your site for installing Extreme Networks equipment. It contains information on environmental and cabling requirements, power requirements, and building and electrical code organizations.

This chapter includes these sections:

- Planning Your Site
- Meeting Site Requirements
- Evaluating and Meeting Cable Requirements
- Meeting Power Requirements
- Applicable Industry Standards

The requirements described in this chapter are intended for the system administrator, network equipment technician, or network manager who is responsible for installing and managing the network hardware. It assumes a working knowledge of local area network (LAN) operations, and a familiarity with communications protocols that are used on interconnected LANs.

By carefully planning your site, you can maximize the performance of your existing network and ensure that it is ready to migrate to future networking technologies.

# Planning Your Site

To install your equipment successfully, you should plan your site carefully. The site planning process has three major steps:

## Step 1: Meeting Site Requirements

Your physical installation site must meet several requirements for a safe and successful installation:

- Building and electrical code requirements
- Environmental, safety, and thermal requirements for the equipment you plan to install
- Distribution rack requirements

## Step 2: Evaluating and Meeting Cable Requirements

You should evaluate and compare your existing cable plant with the requirements of the Extreme Networks equipment to determine if you need to install new cables (or cabling).

## Step 3: Meeting Power Requirements

To run your equipment safely, you must meet the specific power requirements for the Extreme Networks equipment that you plan to install.



*Note: Review and follow the safety information located in the user guide for the equipment you are installing.*

# Meeting Site Requirements

This section addresses the various requirements to consider when preparing your installation site, including:

- Operating Environment Requirements
- Rack Specifications and Recommendations

## Operating Environment Requirements

You need to verify that your site meets all environmental and safety requirements.

Virtually all areas of the United States are regulated by building codes and standards. During the early planning stages of installing or modifying your LAN, it is important that you develop a thorough understanding of the regulations that pertain to your location and industry.

## Building and Electrical Codes

Building and electrical codes vary depending on your location. Comply with all code specifications when planning your site and installing cable. The following sections are provided as a resource to obtain additional information.

Three major building codes are:

- Uniform Building Code—produced by the International Conference of Building Officials (ICBO); 5360 South Workman Mill Road; Whittier, California 90601 USA. [www.icbo.org](http://www.icbo.org)
- BOCA Basic Building Code—produced by the Building Officials and Code Administrators (BOCA) International, Inc.; 4051 West Flossmoor Road; Country Club Hills, Illinois 60478 USA. [www.bocai.org](http://www.bocai.org)
- Standard Building Code (SBC)—produced by the Southern Building Code Congress International, Inc.; 900 Montclair Road; Birmingham, Alabama 35213 USA. [www.sbcci.org](http://www.sbcci.org)

Five authorities on electrical codes are:

- National Electrical Code (NEC) Classification (USA only)—a recognized authority on safe electrical wiring. Federal, state, and local governments use NEC standards to establish their own laws, ordinances, and codes on wiring specifications. The NEC classification is published by the National Fire Protection Association (NFPA). The address is NFPA; 1 Batterymarch Park; Quincy, Massachusetts 02269 USA. [www.nfpa.org](http://www.nfpa.org)
- Underwriters' Laboratory (UL) (USA only)—an independent research and testing laboratory. UL evaluates the performance and capability of electrical wiring and equipment to determine whether they meet certain safety standards when properly used. Acceptance is usually indicated by the words "UL Approved" or "UL Listed." The address is UL; 333 Pfingsten Road; Northbrook, Illinois 60062-2096 USA. [www.ul.com](http://www.ul.com)
- National Electrical Manufacturing Association (NEMA) (USA only)—an organization of electrical product manufacturers. Members develop consensus standards for cables, wiring, and electrical components. The address is NEMA; 2101 L Street N.W.; Washington, D.C. 20037 USA. [www.nema.org](http://www.nema.org)
- Electronics Industry Association (EIA)—a trade association that develops technical standards, disseminates marketing data, and maintains contact with government agencies in matters relating to the electronics industry. The address is EIA; 2001 Eye Street N.W.; Washington, D.C. 20006 USA. [www.eia.org](http://www.eia.org)
- Federal Communications Commission (FCC)—a commission that regulates all interstate and foreign electrical communication systems that originate in the United States according to the Communications Act of 1934. The FCC regulates all U.S. telephone and cable systems. The address is FCC; 1919 M Street N.W.; Washington, D.C. 20554 USA.

## Wiring Closet Considerations

You should consider the following recommendations for your wiring closet:

- Ensure that your system is easily accessible for installation and service. See “Rack Specifications and Recommendations” on page 2-12 for specific recommendations.
- Use AC power, 15-amp service receptacles, type N5/15 or NEMA 5-15R for 120 VAC.
- Use 30 A at -40 VDC (or equivalent power between -40 and -70 VDC) for Alpine DC power supplies. For Alpine DC power and ground cables, use 8 AWG, high-strand-count wire cable (Alpine 3808) or 10 AWG, high-strand-count wire cable (Alpine 3804).
- Use AC power, 20 A service receptacle, NEMA L5-20R for BlackDiamond 110 VAC power supplies.
- Use AC power, 20 A service receptacle, NEMA L6-20R for BlackDiamond 220 VAC power supplies.
- Use 55 A service for BlackDiamond DC power supplies. For BlackDiamond DC power cables, use 4 AWG, high-strand-count wire cable.
- Use a vinyl floor covering in your wiring closet. (Concrete floors accumulate dust, and carpets can cause static electricity.)
- Prevent unauthorized access to wiring closets by providing door locks.
- Provide adequate overhead lighting for easy maintenance.
- Ensure that each wiring closet has a suitable ground. All distribution racks and equipment installed in the closet should be grounded.
- Ensure that all system environmental requirements are met, such as ambient temperature and humidity.



*Note: Extreme Networks recommends that you consult an electrical contractor for commercial building and wiring specifications.*

**Temperature.** Extreme Networks equipment generates a significant amount of heat. It is essential that you provide a temperature-controlled environment for both performance and safety.

The following are some general thermal recommendations for your wiring closet:

- Ensure that the ventilation in the wiring closet is adequate to maintain a temperature below 104° F (40° C).
- Install a reliable air conditioning and ventilation system.

- Keep the ventilation in the wiring closet running during nonbusiness hours; otherwise, the equipment can overheat.
- Maintain ambient operating temperature: 32° to 104° F (0° to 40° C)
- Maintain storage Temperature: -40° to 158° F (-40° to 70° C)



*Note: Like all electrical equipment, product lifetimes degrade with increased temperature. If possible, temperatures should be kept at approximately 78° F (25° C) or lower.*

**BlackDiamond 6816 Spacing Requirements.** Due to chassis-to-chassis heating, Extreme Networks recommends placing no more than three BlackDiamond 6816 chassis next to each other.

The following are some general recommendations for installing your BlackDiamond 6816 chassis:

- A minimum of 17.32 inches (44 cm) between each set of three BlackDiamond 6816 chassis.  
Or
- Place front-back cooled equipment, such as a BlackDiamond 6808 chassis, between each set of three BlackDiamond 6816 chassis.  
Or
- Place patch panels, which are used to patch cables together, between each set of three BlackDiamond 6816 chassis. A patch panel does not require any power and does not generate any heat.



*Note: Up to five adjacent BlackDiamond 6816 chassis will continue to function without safety concerns. However, product lifetime may degrade with continued exposure to high temperatures in close proximity and long term reliability may be compromised.*

**Air flow Requirements.** To ensure proper air flow through an Extreme Networks switch, refer to the following recommendations when you are installing your switch:

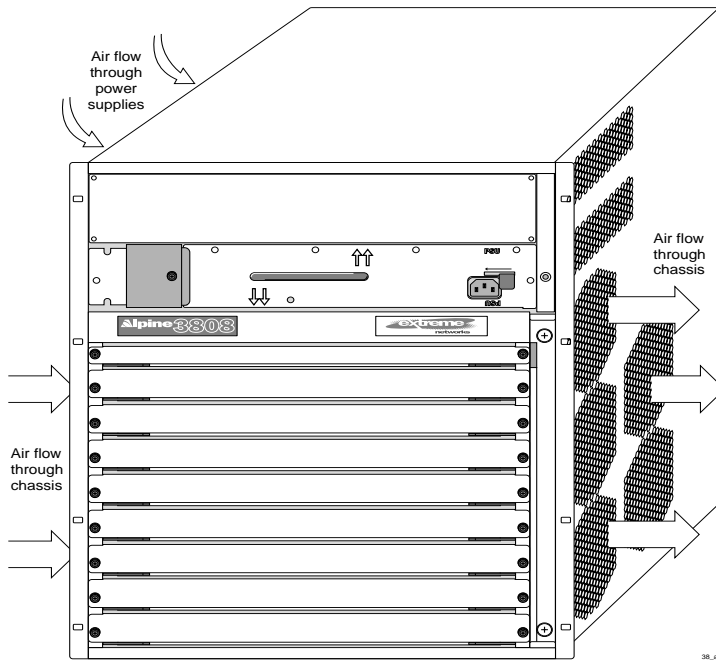
- The Summit family of switches require 3 inches (7.62 cm) on both the left and right sides of the switch (5 inches (12.7 cm) recommended) for proper air flow.
- The Alpine 3800 series chassis require 3 inches (7.62 cm) on both the left and right sides of the switch (5 inches (12.7 cm) recommended) for proper air flow.

- The BlackDiamond 6816 and 6804 chassis require 3 inches (7.62 cm) around the entire chassis—front, rear, and sides—(5 inches (12.7 cm) recommended) for proper air flow.
- The BlackDiamond 6808 chassis requires 3 inches (7.62 cm) around both the front and rear of the chassis (5 inches (12.7 cm) recommended) for proper air flow.

The air flow of the Summit family of switches moves from the left side of the switch to the right side of the switch or from the right side of the switch to the left side of the switch depending on the model.

The air flow of the Alpine 3808 moves through the power supplies and is independent of the air flow through the chassis as shown in Figure 2-1. For example, if the power supply fans fail, the air flow through the module area of the chassis will not cool down the power supplies.

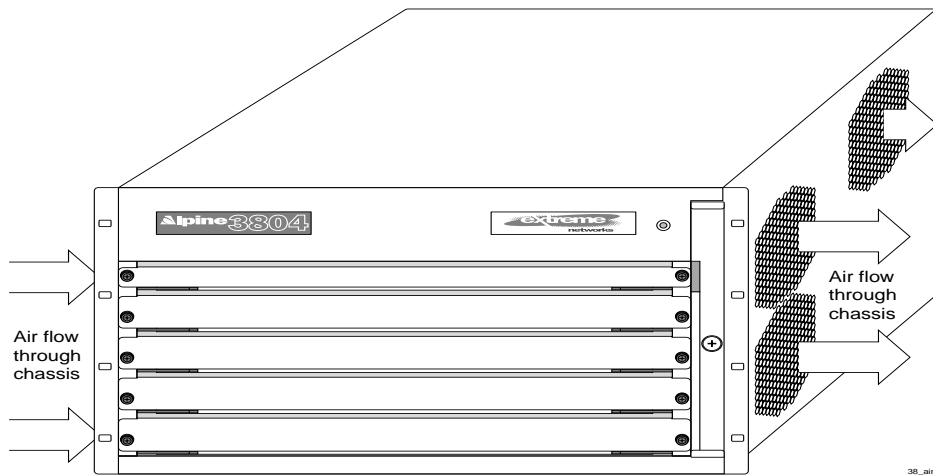
- Air flow for cooling power supplies enters the top of the chassis and moves left to right as you face the chassis.
- Air flow for cooling modules moves left to right as you face the chassis.



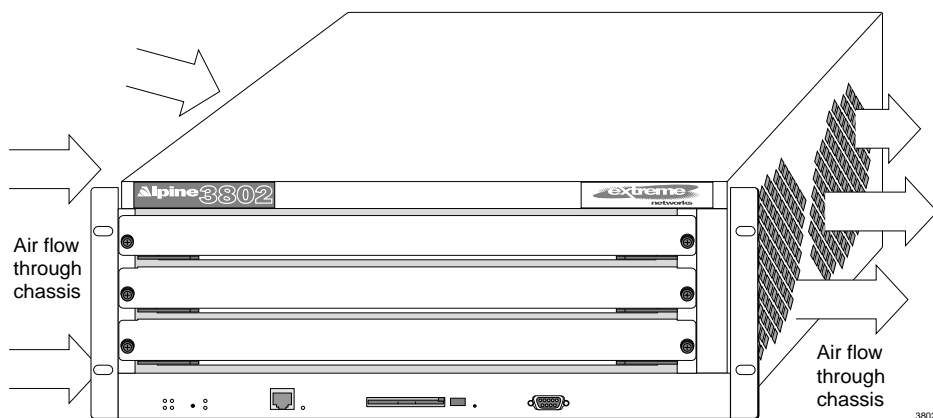
**Figure 2-1:** Air flow through the Alpine 3808 chassis

The air flow of the Alpine 3804 and Alpine 3802 moves from the left side of the chassis to the right side of the chassis as shown in Figure 2-2 and Figure 2-3.

- Air flow for cooling power supplies moves left to right as you face the chassis.
- Air flow for cooling modules moves left to right as you face the chassis.



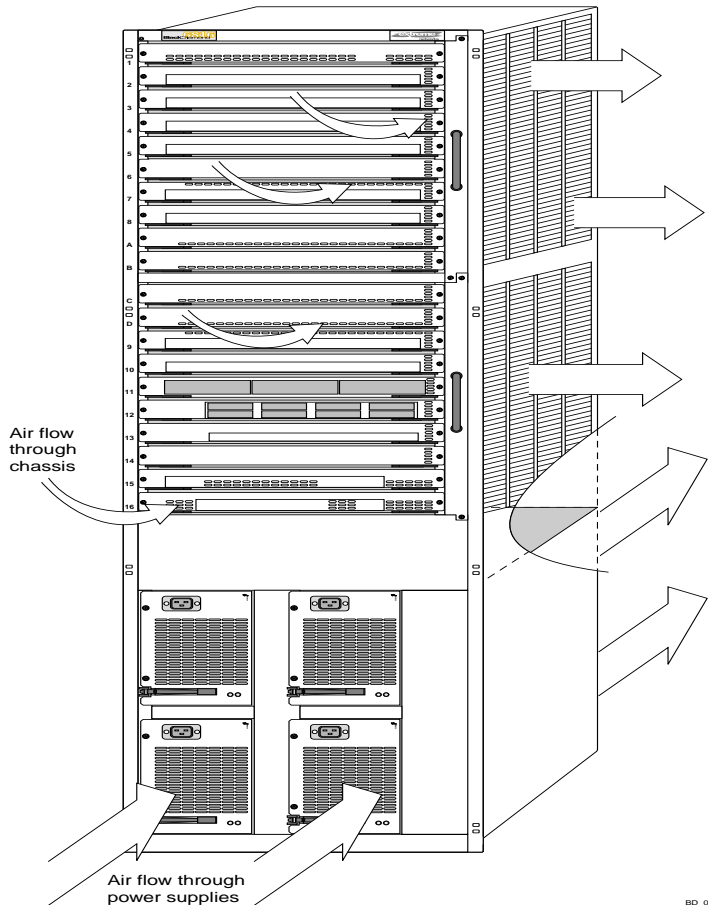
**Figure 2-2:** Air flow through the Alpine 3804 chassis



**Figure 2-3:** Air flow through the Alpine 3802 chassis

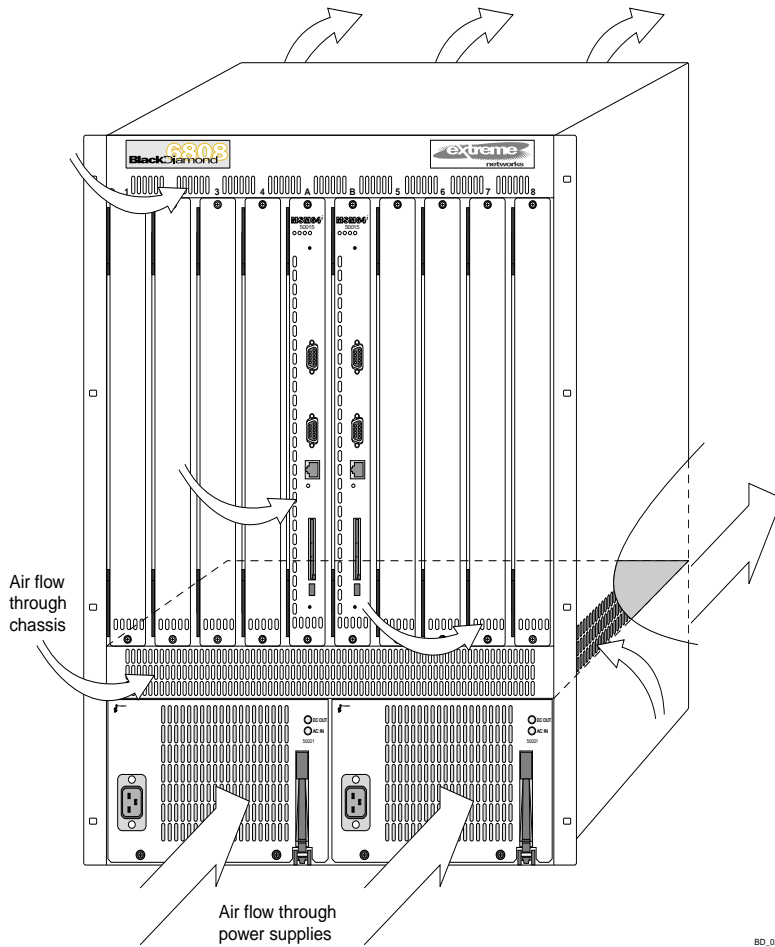
The air flow of the BlackDiamond 6800 series chassis moves through the power supplies and is independent of the airflow through the modules as shown in Figure 2-4 and Figure 2-5. For example, if the power supply fans fail, the air flow through the module area of the chassis will not cool down the power supplies.

- Air flow for cooling power supplies moves front to back as you face the chassis.
- Air flow for cooling modules moves left to right as you face the chassis.



BD\_032

**Figure 2-4:** Air flow through the BlackDiamond 6816 chassis



BD\_027

**Figure 2-5:** Air flow through the BlackDiamond 6808 chassis

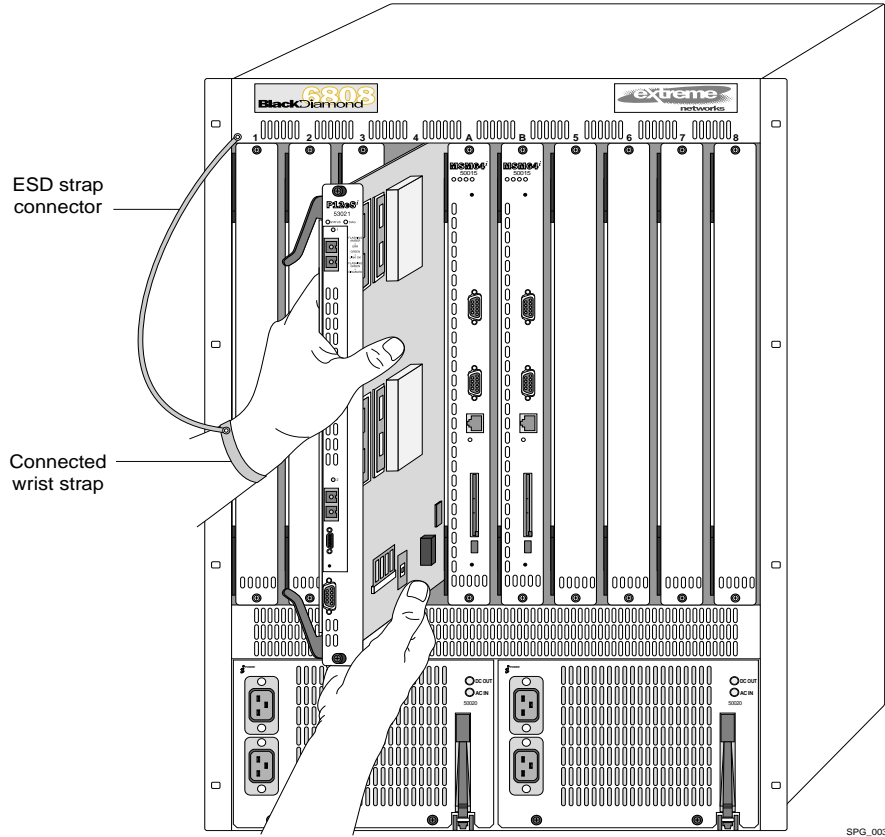
**Humidity.** Operating humidity should be kept between 10 and 95% relative humidity (noncondensing).

## Electrostatic Discharge (ESD)

Your system must be protected from static electricity. Take the following measures to ensure optimum system performance:

- Keep relative humidity at 50 to 70%.

- Remove materials that can cause electrostatic generation (such as synthetic resins) from the wiring closet. Check the appropriateness of floor mats and flooring.
- Connect conductors (metals, etc.) to ground, using dedicated grounding lines.
- Use electrostatically safe equipment and the ESD straps that are provided with your equipment. All Alpine and BlackDiamond switches come with ESD wrist strap connectors and wrist straps as shown in Figure 2-6.



**Figure 2-6:** Ensure that you use an ESD wrist strap when handling switch components

## Rack Specifications and Recommendations

Racks should conform to conventional standards. In the United States, refer to EIA Standard RS-310C: Racks, Panels, and Associated Equipment. In countries other than the United States, refer to IEC Standard 297. In addition, verify that your rack meets the basic mechanical and space requirements that are described in this section.

### Mechanical Recommendations for the Rack

Use distribution racks that meet the following mechanical recommendations:

- Use an open style, 19-inch (48.26-cm) rack to facilitate easy maintenance and to provide proper ventilation.
- The rack should use the universal mounting rail hole pattern that is identified in IEC Standard 297.
- The mounting holes should be flush with the rails to accommodate the chassis.
- Use a rack made of steel or aluminum.
- Install equipment into the lower half of the rack first to avoid making the rack top-heavy.
- The rack should support approximately 600 pounds (272 kilograms).

### Protective Grounding for the Rack

Use a rack grounding kit and a ground conductor that is carried back to earth or to another suitable building ground.

All Extreme Networks switches are designed with mounting brackets that provide solid metal-to-metal connection to the rack. If you do not use equipment racks, you can attach wiring terminals directly to the mounting brackets for appropriate grounding. Alpine products have grounding terminals that are mounted on the back of the chassis.

At minimum, follow these guidelines:

- Ground equipment racks to earth ground.
  - CAD weld appropriate wire terminals to building I-beams or earth ground rods.
  - Use #4 copper wire.
  - Drill and tap wire terminals to equipment racks.

- Position the earth ground as close to the equipment rack as possible to maintain the shortest wiring distance possible.
- Properly test the quality of the earth ground.



*Note: Because building codes vary world-wide, Extreme Networks strongly recommends that you consult an electrical contractor to ensure proper equipment grounding is in place for your specific installation.*

- Ground DC power supplies to earth ground by using the grounding terminals provided.

## Space Requirements for the Rack

Provide enough space in front of and behind the switch so that you can service it easily. Allow a minimum of 4 feet (121.92 cm) in front of the rack and 2 feet (60.96 cm) behind the rack. When using a relay rack, provide a minimum of 2 feet (60.96 cm) of space behind the mounted equipment. Extra room on each side is optional.

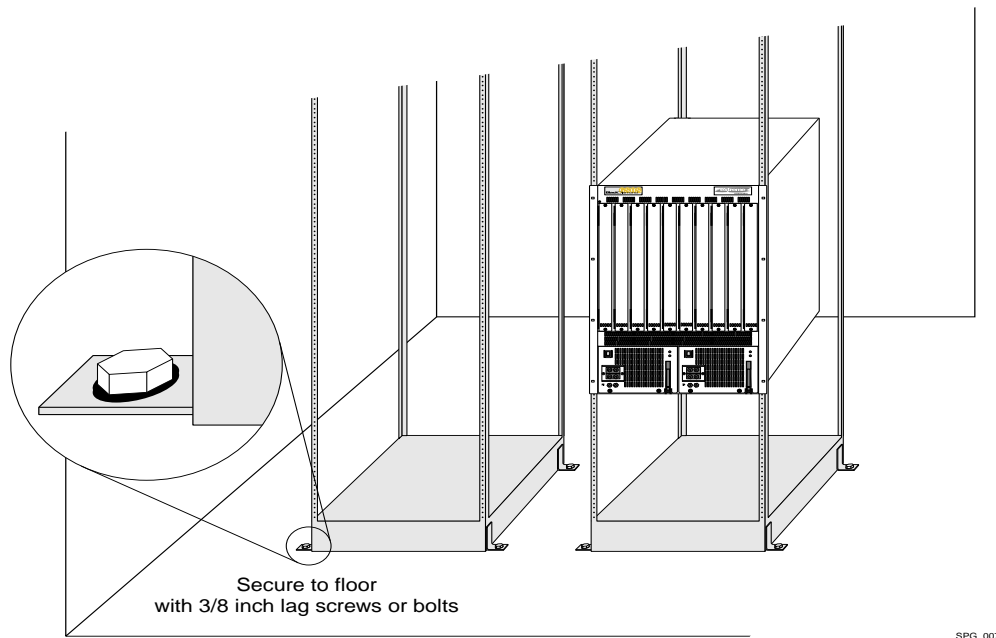


*Note: Install your equipment rack near an easily accessible power outlet. You should power down your equipment only by removing the power cord from the power source.*

## Securing the Rack

The rack should be attached to the wiring closet floor with 3/8 inch (9.5 mm) lag screws or equivalent hardware. The floor under the rack should be level within 3/16 inch

(5 mm). Use a floor-leveling cement compound if necessary or bolt the racks to the floor as shown in Figure 2-7.



**Figure 2-7:** Properly secured rack

Brace open distribution racks if the channel thickness is less than 1/4 inch (6.4 mm).

## Evaluating and Meeting Cable Requirements

This section addresses requirements for the that cable you should use when installing your network equipment. It includes:

- Cabling Standards
- Cable Labeling and Record Keeping
- Installing Cable
- RJ-45 Connector Jackets
- Radio Frequency Interference

## Cabling Standards

We recommend using the BICSI (Building Industry Consulting Service International) RCDD (Registered Communications Distribution Designer), which is globally recognized as a standard in site planning and cabling. For information, go to <http://www.bicsi.org>

## Cable Labeling and Record Keeping

A reliable cable labeling system is essential when planning and installing a network. Maintaining accurate records helps you to:

- Relocate devices easily.
- Make changes quickly.
- Isolate faults in the distribution system.
- Locate the opposite end of any cable.
- Know the types of network devices that your cabling infrastructure can support.

Consider the following recommendations when setting up a cable labeling system suitable for your installation:

- Identify cables by securely attaching a label to all cable ends.
- Assign a unique block of sequential numbers to the group of cables that run between each pair of wiring closets.
- Assign a unique identification number to each distribution rack.
- Identify all wiring closets by labeling the front panel of your Extreme Networks equipment and other hardware.
- Keep accurate and current cable identification records.
- Post records near each distribution rack. Include the following cable drop information: the cable source, destination, and jumper location.

## Installing Cable

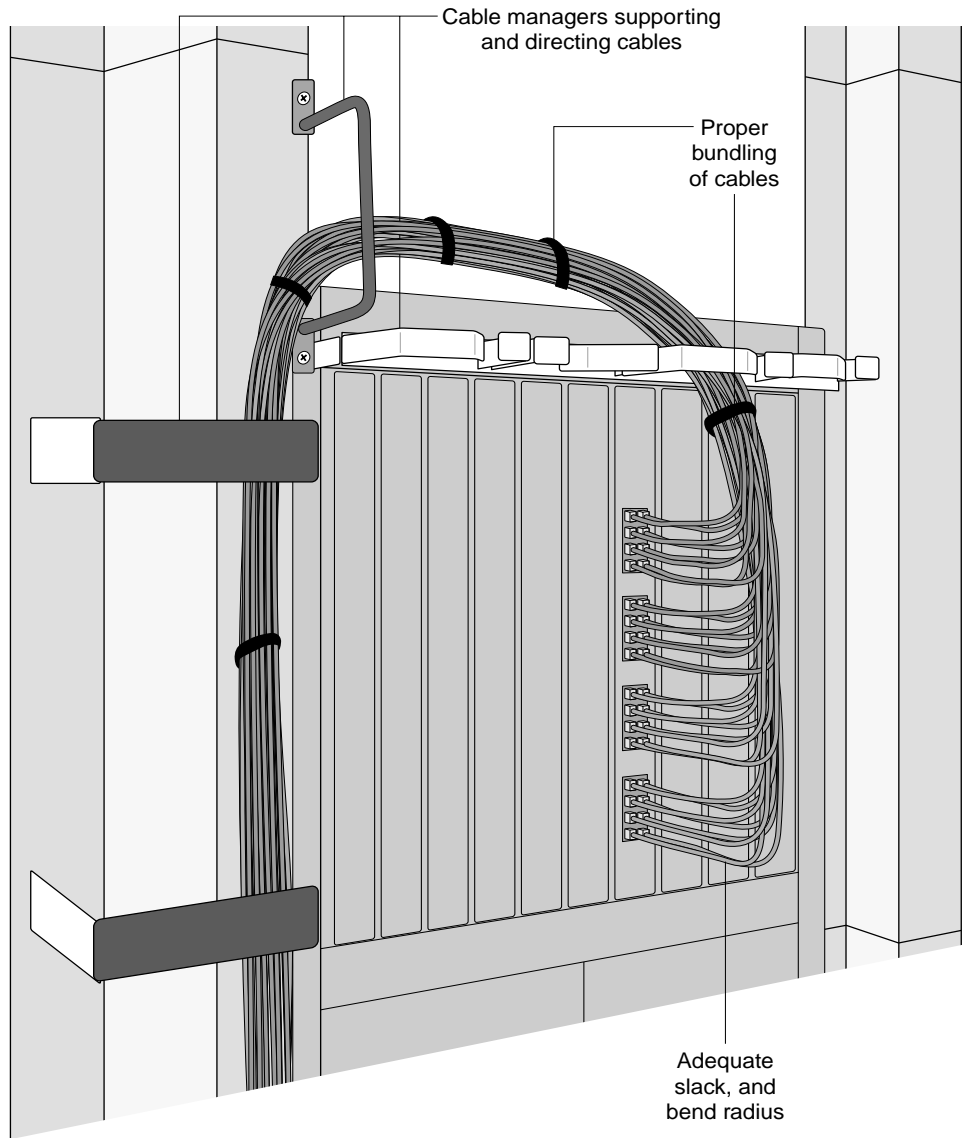
Consider the following recommendations when you connect cable to your network equipment:

- Examine cable for cuts, bends, and nicks.
- Support cable using a cable manager that is mounted above connectors to avoid unnecessary weight on the cable bundles.

- Use cable managers to route cable bundles to the left and right of the network equipment to maximize accessibility to the connectors.
- Provide enough slack—approximately 2-3 inches (5.08-7.62 cm)— to provide proper strain relief as shown in Figure 2-8.
- Bundle cable using velcro straps to avoid injuring cables.
- If you build your own cable, ensure that cable is properly crimped.
- When installing a patch panel using twisted pair wiring, untwist no more than 1” of the cable to avoid RF interference.
- When required for safety and fire rating requirements, use plenum-rated cable. See your local building codes for determining when it is appropriate to use plenum-rated cable, or refer to IEC standard 850.
- Keep all ports and connectors free of dust.



*Note: Unshielded twisted pair (UTP) cable can build up ESD charges when being pulled into a new installation. Before installing category 5 UTP cables, discharge ESD from the cable by plugging it into a port on a switch or any network device that is not powered on.*

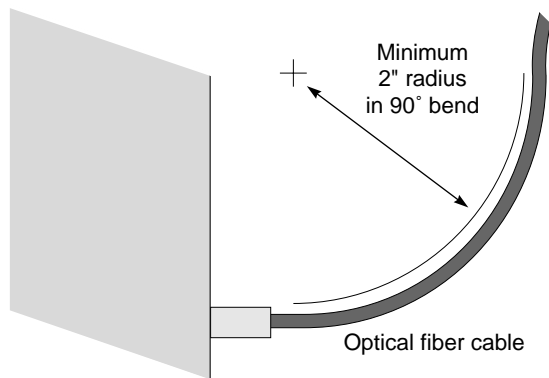


SPG\_008

**Figure 2-8:** Properly installed and bundled cable

Fiber Optic Cable

Fiber optic cable must be treated gently during installation. Every cable has a minimum bend radius, for example, and fibers will be damaged if the cables are bent too sharply. It is also important not to stretch the cable during installation. We recommend that the bend radius for fiber optic cable equals 2-inch (5.08 cm) minimum for each 90 degree turn as shown in Figure 2-9.



SPG\_002

Figure 2-9: Bend radius for fiber optic cable

Cable Distances

Table 2-1 shows cable media types and maximum distances that support reliable transmission in accordance with international standards except where noted.

Table 2-1: Media Types and Maximum Distances

Standard	Media Type	Mhz•Km Rating	Maximum Distance (Meters)
1000BASE-SX (850 nm optical window)	50/125 µm multimode fiber	400	500
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	160	220
	62.5/125 µm multimode fiber	200	275

**Table 2-1:** Media Types and Maximum Distances (continued)

Standard	Media Type	Mhz•Km Rating	Maximum Distance (Meters)
1000BASE-LX (1300 nm optical window)	50/125 µm multimode fiber	400	550
	50/125 µm multimode fiber	500	550
	62.5/125 µm multimode fiber	500	550
	10/125 µm single-mode fiber	—	5,000
	10/125 µm single-mode fiber*	—	10,000*
1000BASE-LX70 (1550 nm optical window)	10/125 µm single-mode fiber	—	70,000
100BASE-FX (1300 nm optical window)	50/125 µm multimode fiber	400	2000
	50/125 µm multimode fiber	500	2000
	62.5/125 µm multimode fiber	400	2000
	62.5/125 µm multimode fiber	500	2000
1000BASE-T	Category 5 and higher UTP cable	—	100
100BASE-TX	Category 5 and higher UTP cable	—	100
10BASE-T	Category 3 and higher UTP cable	—	100

\* Proprietary to Extreme Networks. Connections between two Extreme Networks 1000BASE-LX interfaces that use 10/125 µm single-mode fiber can use a maximum distance of 10,000 meters.

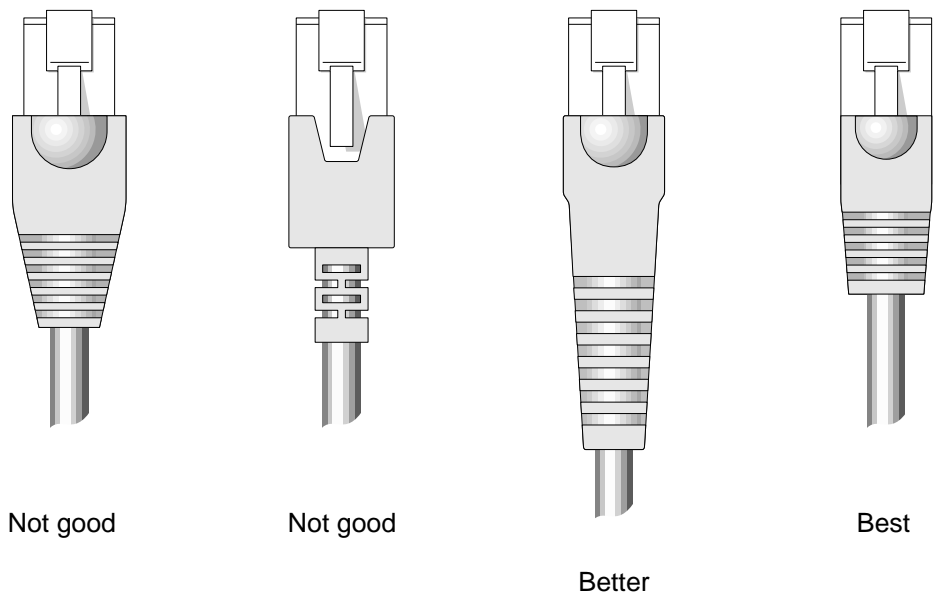
## RJ-45 Connector Jackets

Use RJ-45 cable with connector jackets that are flush with the connector or that have connectors with a no-snag feature.

Using cable with jackets that are wider than the connectors can cause:

- Connectors that are not properly aligned with the port.
- Crowded cable installation, which can cause connectors to pop out of the port.

Figure 2-10 shows examples of connector jacket types that are not recommended as well as those that are recommended.



SPG\_001

**Figure 2-10:** RJ-45 connector jacket types

## Radio Frequency Interference

If you use unshielded twisted pair (UTP) cabling in an installation, take precautions to avoid radio frequency (RF) interference. RF interference can cause degradation of signal quality, and, in an Ethernet network environment, can cause excessive collisions, loss of link status, or other physical layer problems that can lead to poor performance or loss of communication.

To prevent RF interference, avoid the following devices or situations:

- Attaching UTP cable to AC power cords
- Routing UTP cable near antennas, such as a Ham radio antenna
- Routing UTP cable near equipment that could exhibit RF interference, such as:
  - ARC welding equipment
  - Electrical motors that contain coils
  - Air conditioner units
  - Electrical transformers

In areas or applications where these situations cannot be avoided, use fiber optic cabling or shielded twisted pair cabling (STP).



*Note: Because harmonics can appear on the neutral line of a typical three-phase power circuit, Extreme Networks recommends using a harmonics meter in new installations.*

# Meeting Power Requirements

This section discusses power requirements, including:

- Power Supply Requirements
- AC Power Cord Requirements
- Uninterruptable Power Supply Requirements

## Power Supply Requirements

Adhere to the following requirements in order to operate your Extreme Networks equipment safely:

- Ensure that your equipment is placed in an area that accommodates the power consumption and component heat dissipation specifications.
- Ensure that your power supply meets the site power, AC power, or DC power requirements of the network equipment.
- Ensure that DC connections are made by an on-site electrician.



*Note: For power specifications for Extreme Networks products, see the Extreme Networks website at <http://www.extremenetworks.com>.*

- When connecting power to installed equipment, avoid connecting through an extension cord or power strip.
- If your switch includes more than one power supply, connect each power supply to different, independent power sources. If a power source fails, it will only affect the switch power supply to which it is connected. If all switch power supplies are connected to a single power source, the entire switch is vulnerable to a power source failure.

## AC Power Cord Requirements

The AC power cord must be approved for the country where it is used. Table 2-2 describes AC power cord requirements.

**Table 2-2:** AC Power Cord Requirements

Country	Requirements
USA and Canada	<ul style="list-style-type: none"> <li>■ The cord set must be UL-approved and CSA-certified.</li> <li>■ The minimum specification for the flexible cord is No. 18 AWG (1.5 mm <sup>2</sup>), Type SVT or SJT, 3-conductor.</li> <li>■ The cord set must have a rated current capacity of at least the amount rated for each specific product.</li> <li>■ The attachment plug must be an Earth-grounding type with a NEMA 5-15P (10 A, 125 V) configuration.</li> </ul>
Denmark	The supply plug must comply with section 107-2-D1, standard DK2-1a or DK2-5a.
Switzerland	The supply plug must comply with SEV/ASE 1011.
Argentina	The supply plug must comply with Argentinian standards.



*Note: When using dual power supplies, make sure that each AC power supply attaches to an independent power source.*

## Replacing the Power Cord

If the power cord plug is unsuitable and must be replaced, connect the power supply wires for the switch according to the following scheme:

- Brown wire to the Live (Line) plug terminal, which may be marked with the letter “L” or colored red.
- Blue wire to the Neutral plug terminal, which may be marked with the letter “N” or colored black.
- Yellow/Green wire to the Ground plug terminal, which may be marked with the letter “E” (the Earth symbol) or colored yellow/green.

## Uninterruptable Power Supply Requirements

An uninterruptible power supply (UPS) is a device that sits between a power supply (such as a wall outlet) and a device (such as a switch) to prevent outages, sags, surges, and bad harmonics from adversely affecting the performance of the device.

## UPS Features

A UPS traditionally can perform the following functions:

- Absorb relatively small power surges.
- Smooth out noisy power sources.
- Continue to provide power to equipment during line sags.
- Provide power for some time after a blackout has occurred.

In addition, some UPS or UPS plus software combinations provide the following functions:

- Automatic shutdown of equipment during long power outages.
- Monitoring and logging of power supply status.
- Display the voltage (current draw) of the equipment.
- Restart equipment after a long power outage.
- Display the voltage currently on the line.
- Provide alarms on certain error conditions.
- Provide short circuit protection.

## Selecting a UPS

To determine UPS requirements for your switch, ask these questions:

- What are the amperage requirements?
- What is the longest potential time period that the UPS would be required to supply backup power?
- Where will the UPS be installed?
- What is the maximum transition time that your installation will allow?



*Extreme Networks recommends that you use a UPS that provides online protection.*

## Calculating Amperage Requirements

To determine the size of UPS that you need, use the following procedure:

- 1 To find VA (Volt-Amps), locate the voltage and amperage requirements for each piece of equipment. These numbers are usually located on a sticker on the back or bottom of your equipment. Then multiply the numbers together to get VA:  
$$\text{VA} = \text{Volts} \times \text{Amperes}$$
- 2 Add the VA from each piece of equipment together to find the total VA requirement.  
To determine the minimum amperage requirements for your UPS, we recommend that you add 30% to the total.

### UPS Transition Time

Transition time is the time that is necessary for the UPS to transfer from utility power to full-load battery power. For Extreme Networks products, a transition time of less than 20 milliseconds is required for optimum performance.

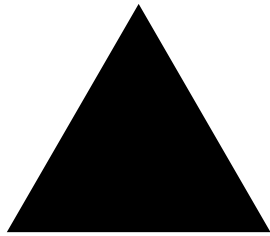
## Applicable Industry Standards

For more information, see the following ANSI/TIA/EIA standards:

- ANSI/TIA/EIA-568-A—discusses the six subsystems of a structured cabling system.
- ANSI/TIA/EIA-569-A—discusses design considerations.
- ANSI/TIA/EIA-606—discusses cabling system administration.
- ANSI/TIA/EIA-607—discusses commercial building grounding and bonding requirements.

You can access these standards at <http://www.ansi.org/> or <http://www.tiaonline.org/>.





# Part 3: Summit Switch

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# Summit Switch Overview

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This chapter describes:

- The different types of Summit switch models
- The features available on the Summit family of switches
- The memory requirements for the Summit family of switches

## Summit Switch Models

The following models comprise the Summit family of switches:

- Summit1i
- Summit5i
- Summit7i
- Summit48i
- Summit48si
- Summit4
- Summit4/FX
- Summit24
- Summit48
- Summit24e2

- Summit24e3
- SummitPx1

## Summary of Features

This section describes the features of the Summit family of switches.

### Summit “i” series and non-”i” series switches

- Virtual local area networks (VLANs), including support for IEEE 802.1Q and IEEE 802.1p
- VLAN aggregation
- Spanning Tree Protocol (STP) (IEEE 802.1D) with multiple STP domains
- Policy-Based Quality of Service (PB-QoS)
- Wire-speed Internet Protocol (IP) routing
- IP multinetting
- DHCP/BOOTP relay
- Extreme Standby Router Protocol (ESRP)
- Routing Information Protocol (RIP) version 1 and RIP version 2
- Open Shortest Path First (OSPF) routing protocol
- Border Gateway Protocol (BGP) version 4
- IPX routing, including RIP and Service Advertisement Protocol (SAP)
- Wire-speed IP multicast routing
- Diffserv
- Access-policy support for routing protocols
- Access list support for packet filtering
- IGMP snooping
- Distance Vector Multicast Routing Protocol (DVMRP)
- Protocol Independent Multicast-Dense Mode (PIM-DM)
- Protocol Independent Multicast-Sparse Mode (PIM-SM)
- Wire-speed IPX, IPX/RIP, and IPX/SAP

- Server Load Balancing (SLB)
- RADIUS client and per-command authentication
- TACACS+
- Console command-line interface (CLI) connection
- Telnet CLI connection
- SSH2 connection
- ExtremeWare™ Vista™ Web-based management interface
- Simple Network Management Protocol (SNMP)
- Remote Monitoring (RMON)

## **Summit24e2**

- VLANs, including support for IEEE 802.1Q and IEEE 802.1p
- STP (IEEE 802.1D)
- DHCP/BOOTP relay
- Broadcast and Multicast storm filtering
- Port mirroring
- Port trunking
- IGMP
- CLI connection
- SNMP
- DNS relay agent
- Password-enabled

## **Summit24e3**

- VLANs, including support for IEEE 802.1Q and IEEE 802.1p
- STP (IEEE 802.1D)
- Quality of Service (QoS), including support for IEEE 802.1p, MAC QoS, and four hardware queues
- Wire-speed IP routing
- DHCP/BOOTP relay

- ESRP-aware
- RIP version 1 and RIP version 2
- Wire-speed IP multicast routing
- IGMP
- RADIUS client and per-command authentication
- TACACS+
- CLI connection
- Telnet CLI connection
- SSH2 connection
- SNMP
- RMON

## SummitPx1

- Wire-speed server load balancing
- Multiple server selection algorithms
- Client IP history
- Cookie detection and tracking
- Persistence
- 1,000,000 simultaneous layer 7 sessions
- 3,000,000 simultaneous layer 4 sessions
- 2,000,000 aggregate connections
- 8,000,000 client IP addresses, cookies, and SSL sessions
- 64,000 real servers
- 64,000 virtual servers

## Memory Requirements

Your “i” series Summit switch must have 32 MB of DRAM in order to support the features in ExtremeWare version 4.0 and above. This is not a requirement for Summit24 and Summit48 switch models, and all currently shipping switches contain 32 MB. Some

earlier models of the Summit switch shipped with 16 MB, and must be upgraded to support ExtremeWare version 4.0 and above.

To determine the memory size in your switch, use the following command:

```
show memory
```

For Summit switches running ExtremeWare 4.0 or later, the switch indicates the total DRAM size in megabytes as part of the output. For Summit switches running ExtremeWare releases prior to 4.0, you must calculate the memory by taking the sum of the bytes listed under `current free` and adding to it the bytes listed under `current alloc`. If the sum is greater than 16,000,000, there is no need to upgrade the memory on the switch. If this is not the case, please contact your supplier.

## Port Connections

Summit switches use a combination of the following types of ports:

- 1000BASE-SX ports using 850 nm duplex SC connectors
- 1000BASE-LX ports using 1300 nm duplex SC connectors
- 1000BASE-SX ports using MT-RJ connectors
- 1000BASE-LX ports using MT-RJ connectors
- Modular 1000BASE-SX using Mini-Gigabit Interface Connectors (mini-GBICs)
- Modular 1000BASE-SX and 1000BASE-LX using Gigabit Interface Connectors (GBICs)
- 10BASE-T/100BASE-TX ports using RJ-45 connectors
- 100BASE-FX ports using 1300 nm duplex SC connectors
- 100BASE-TX/1000BASE-T ports using RJ-45 connectors

Table 3-1 describes port configurations available on the different Summit switch models.

**Table 3-1:** Port Configurations on All Summit Switch Models

Switch Model	Ethernet Ports						
	1000BASE-SX	1000BASE-LX	100/1000 BASE-T	GBIC	Redundant GBIC	10BASE-T/100BASE-TX	100BASE-FX
Summit1i SX	6			2			
Summit1i TX			6	2			
Summit5i SX	12			4			
Summit5i LX		12		4			
Summit5i TX			12	4			
Summit7i SX	28			4			
Summit7i TX			28	4			
Summit48i				2	2	48	
Summit48si				2		48	
Summit4	6					16	
Summit4/FX	6						16
Summit24				1	1	24	
Summit48				2	2	48	
Summit24e2				2		24	
Summit24e2 TX			2			24	
Summit24e3				2		24	
SummitPx1				1			



# Summit Switch Models

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This chapter describes:

- The different Summit switch models
- The front and rear views of the Summit switch models
- The LEDs on the Summit switch models

## Switch Models

The following models comprise the Summit family of switches:

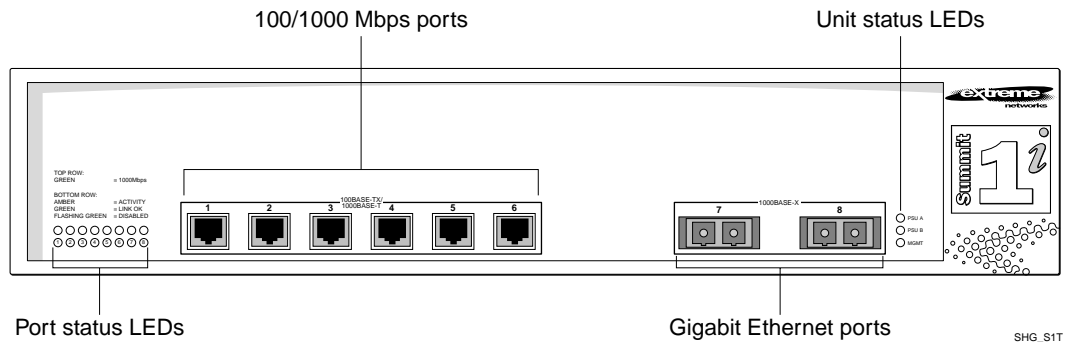
- Summit1i on page 4-3
- Summit5i on page 4-6
- Summit7i on page 4-10
- Summit48i on page 4-15
- Summit48si on page 4-18
- Summit4 on page 4-23
- Summit4/FX on page 4-24
- Summit24 on page 4-25
- Summit48 on page 4-26
- Summit24e2 on page 4-30

- Summit24e3 on page 4-32
- SummitPx1 on page 4-35

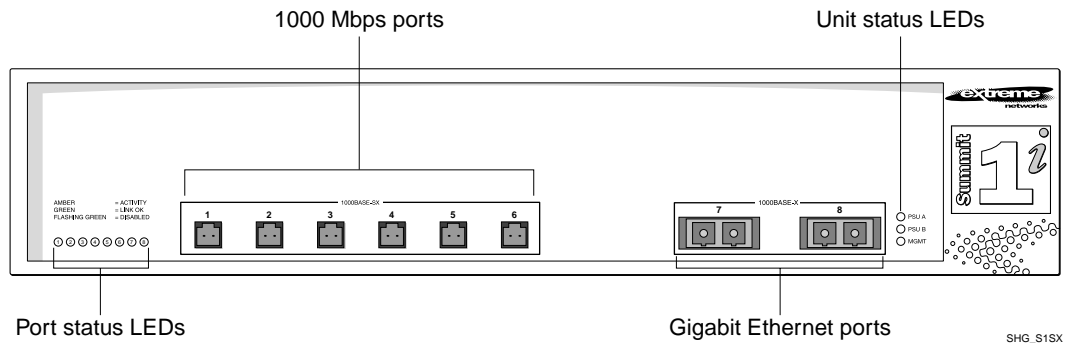
# Summit1i Switch Front View

As shown in Figure 4-1 and Figure 4-2, the Summit1i switch is 2U in height and is available in two port configurations:

- Six autosensing 100BASE-TX/1000BASE-T ports with RJ-45 connectors and two 1000BASE-X ports with SC connectors
- Six 1000BASE-SX ports with MT-RJ connectors and two 1000BASE-X ports with SC connectors



**Figure 4-1:** Front view of Summit1i switch with 100BASE-TX/1000BASE-T ports



**Figure 4-2:** Front view of Summit1i switch with 1000BASE-SX ports

## GBIC Ports

Both Summit1i switch models provide two unpopulated GBIC ports with SC connectors. You can use any of the following GBICs in these ports:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-LX70



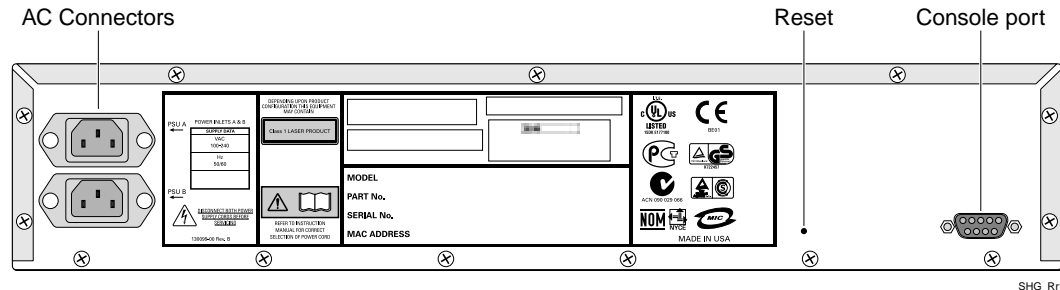
*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*



*Note: See “Summit1i, Summit5i, Summit7i, Summit48i, and Summit48si Switch LEDs,” on page 4-22 for information on LED activity.*

## Summit1i Switch Rear View

Figure 4-3 shows the rear view for both available Summit1i switch models.



**Figure 4-3:** Rear view of the Summit1i switch

## Power Sockets

The Summit1i switch supports up to two power supplies. Each power supply has its own power socket. When a second power supply is installed and connected to a second independent power source, both provide a redundant, load-shared power source to the Summit1i switch. If one of the power sources or power supplies fails, the second power supply provides all power needs which ensures uninterrupted network operation.



*Caution: Service to Summit1i power supplies should be performed by trained service personnel only.*

## **Serial Number**

Refer to the serial number when you contact Extreme Networks technical support.

## **MAC Address**

This label shows the unique Ethernet MAC address that Extreme Networks has assigned to the device.

## **Reset Button**

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

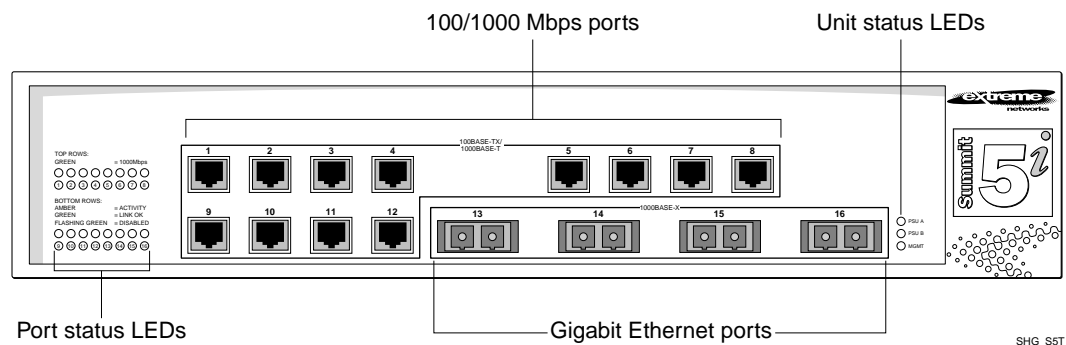
## **Console Port**

Use the console port (9-pin, “D” type connector) to attach a terminal and access the CLI via a serial connection. Use the console port for local management.

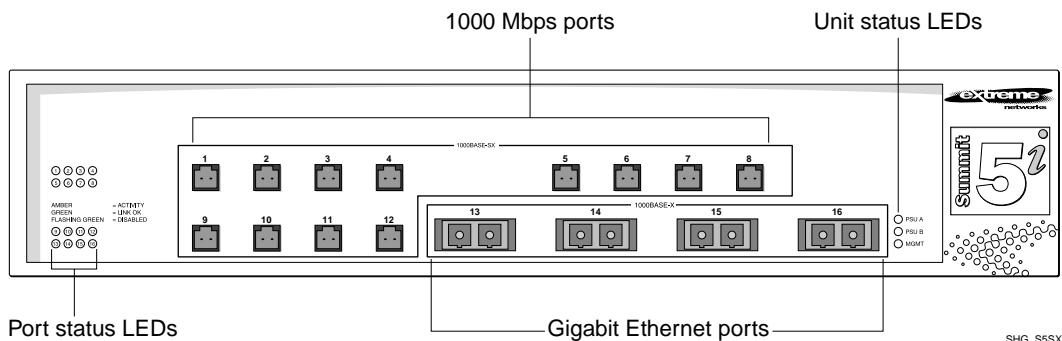
## Summit5i Switch Front View

As shown in Figure 4-4, Figure 4-5, and Figure 4-6, the Summit5i switch is 2U in height and is available in three port configurations:

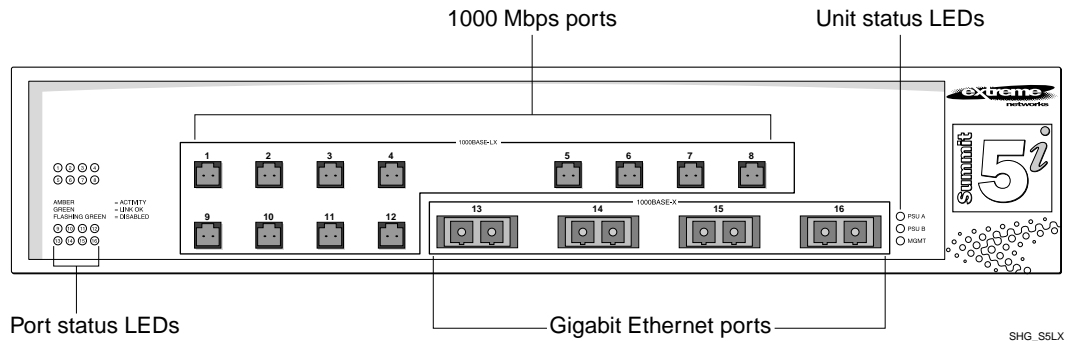
- 12 autosensing 100BASE-TX/1000BASE-T ports with RJ-45 connectors and 4 1000BASE-X ports with SC connectors
- 12 1000BASE-SX ports with MT-RJ connectors and 4 1000BASE-X ports with SC connectors
- 12 1000BASE-LX ports with MT-RJ connectors and 4 1000BASE-X ports with SC connectors



**Figure 4-4:** Front view of Summit5i switch with 100BASE-TX/1000BASE-T ports



**Figure 4-5:** Front view of Summit5i switch with 1000BASE-SX ports



**Figure 4-6:** Front view of Summit5i switch with 1000BASE-LX ports

## GBIC Ports

All three Summit5i switch models provide four unpopulated GBIC ports with SC connectors. You can use any of the following GBICs in these connectors:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-LX70



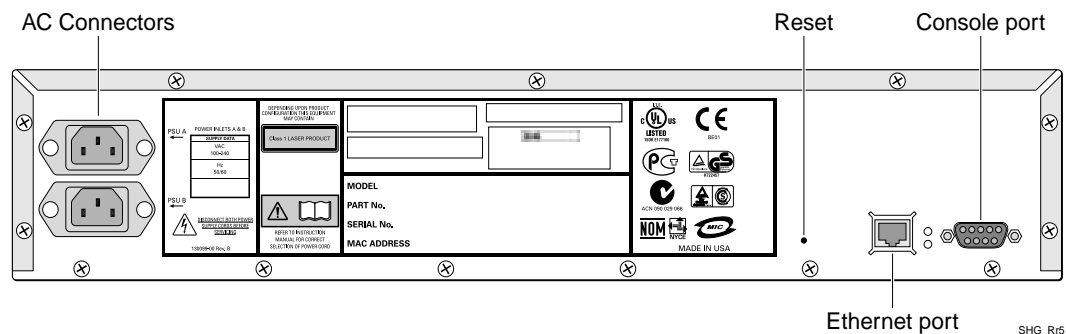
*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*



*Note: See “Summit1i, Summit5i, Summit7i, Summit48i, and Summit48si Switch LEDs,” on page 4-22 for information on LED activity.*

# Summit5i Switch Rear View

Figure 4-7 shows the rear view for the Summit5i switch.



**Figure 4-7:** Rear view of the Summit5i switch

## Power Sockets

The Summit5i switch supports up to two power supplies. Each power supply has its own power socket. When a second power supply is installed and connected to a second independent power source, both provide a redundant, load-shared power source to the Summit5i switch. If one of the power sources or power supplies fails, the second power supply provides all power needs which ensures uninterrupted network operation.



*Note: Summit5i switch power supplies must be serviced by personnel trained by Extreme Networks, only.*

## Serial Number

Refer to the serial number when you contact Extreme Networks technical support.

## MAC Address

This label shows the unique Ethernet MAC address that Extreme Networks has assigned to the device.

## Reset Button

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

## Console Port

Use the console port (9-pin, “D” type connector) to attach a terminal and access the CLI via a serial connection. Use the console port for local management.

## Management Port

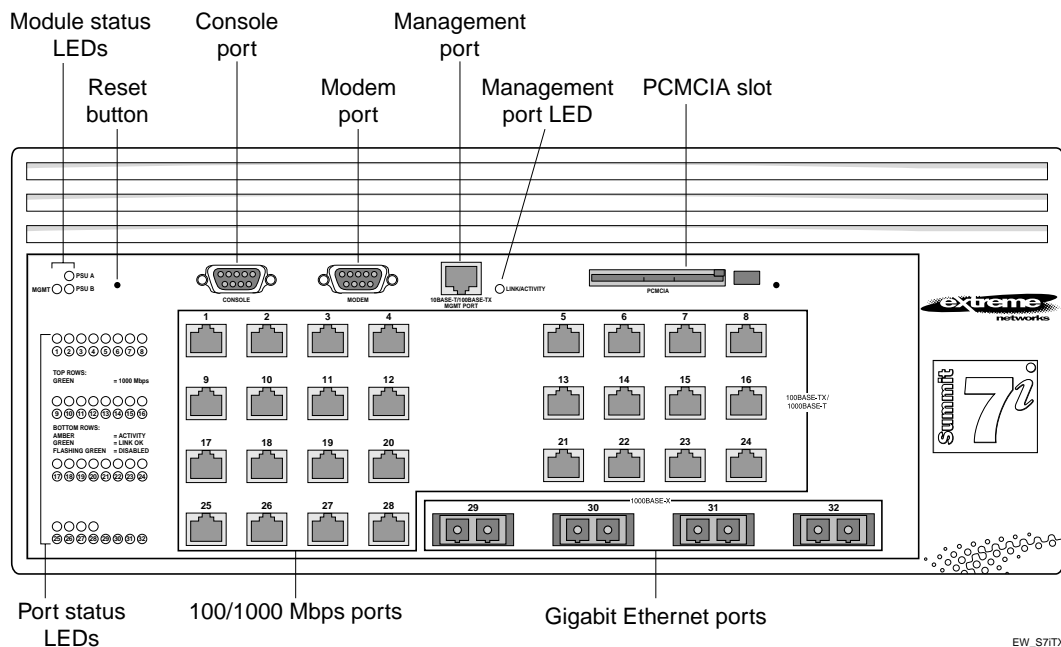
Use the management port (10/100 Mbps Ethernet, RJ-45 connector) to plug an Ethernet cable directly from your laptop into the switch for out-of-band management. This provides you with direct access into the switch and allows you to view and locally manage the switch configurations.

See Chapter 1 for more information about the management port.

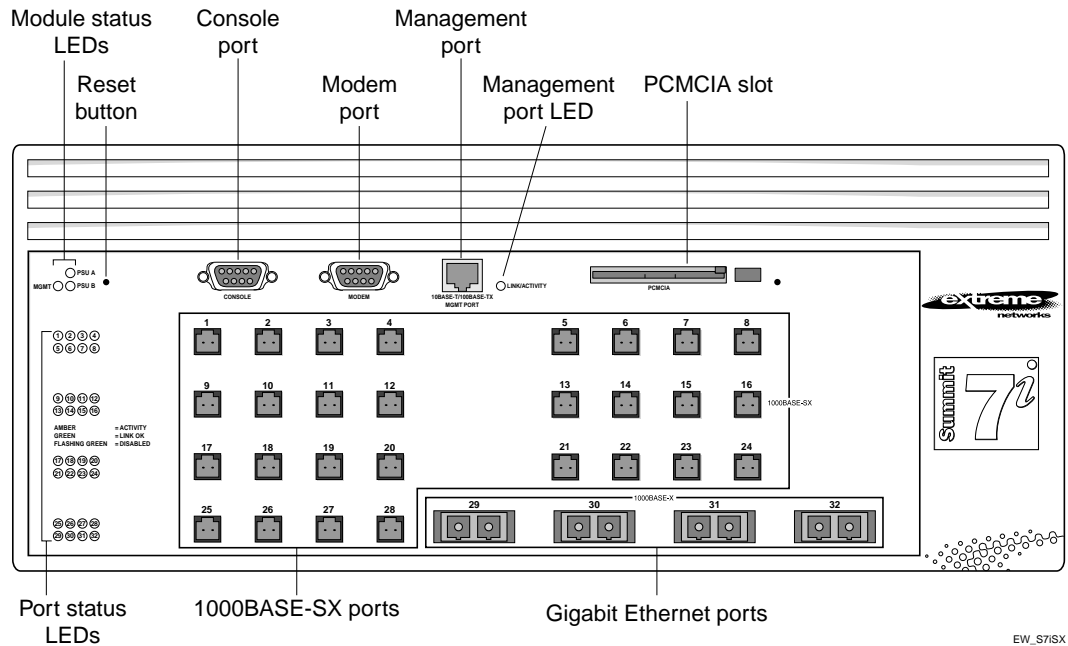
# Summit7i Switch Front View

As shown in Figure 4-8 and Figure 4-9, the Summit7i switch is 4U in height and is available in two port configurations:

- 28 autosensing 100BASE-TX/1000BASE-T ports with RJ-45 connectors and 4 1000BASE-X ports with SC connectors
- 28 1000BASE-SX ports with MT-RJ connectors and 4 1000BASE-SX ports with SC connectors.



**Figure 4-8:** Front view of Summit7i switch with 100BASE-TX/1000BASE-T ports



**Figure 4-9:** Front view of Summit7i switch with 1000BASE-SX ports

## GBIC Ports

Both Summit7i switch models provide four unpopulated GBIC ports with SC connectors. You can use any of the following GBICs in these ports:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-LX70



*Note:* See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.



*Note:* See “Summit1i, Summit5i, Summit7i, Summit48i, and Summit48si Switch LEDs,” for information on LED activity.

## Reset Button

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

## Console Port

Use the console port (9-pin, “D” type connector) to attach a terminal and access the CLI via a serial connection. Use the console port for local management.

## Modem Port

Use the modem port to connect a modem for remote access to the command line interface (CLI).

## Management Port

Use the management port (10/100 Mbps Ethernet, RJ-45 connector) to plug an Ethernet cable directly from your laptop into the switch for out-of-band management. This provides you with direct access into the switch and allows you to view and locally manage the switch configurations.

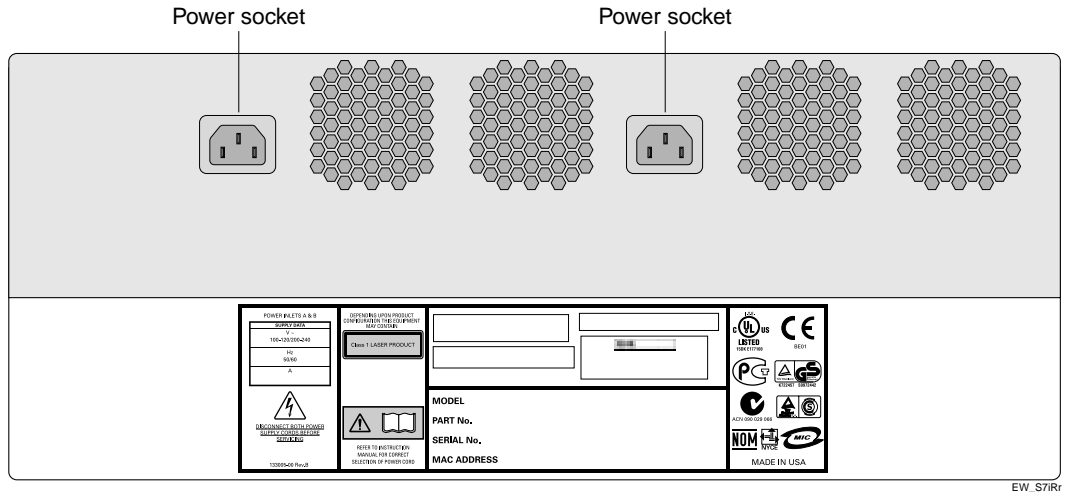
See Chapter 1 for more information about the management port.

## PCMCIA Slot

The PCMCIA slot is reserved for future use.

# Summit7i Switch Rear View

Figure 4-10 shows the rear view for both available Summit7i switch models.



**Figure 4-10:** Rear view of the Summit7i switch

## Power Sockets

The Summit7i switch supports up to two power supplies. Each power supply has its own power socket. When a second power supply is installed and connected to a second independent power source, both provide a redundant, load-shared power source to the Summit7i switch. If one of the power sources or power supplies fails, the second power supply provides all power needs which ensures uninterrupted network operation.



*Note: Summit7i switch power supplies must only be serviced by personnel trained by Extreme Networks.*

## Serial Number

Refer to the serial number when you contact Extreme Networks technical support.

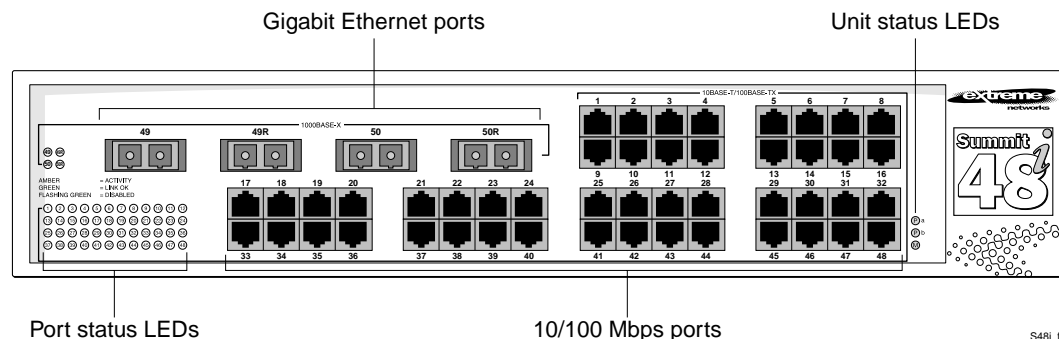
## MAC Address

This label shows the unique Ethernet MAC address that Extreme Networks has assigned to the device.

# Summit48i Switch Front View

The Summit48i switch is 2U in height and has 48 autosensing 10BASE-T/100BASE-TX ports and 4 1000BASE-X ports with SC connectors.

Figure 4-11 shows the front view of the Summit48i switch.



**Figure 4-11:** Front view of Summit48i switch

## GBIC Ports

The Summit48i switch has two Gigabit Ethernet ports and two redundant Gigabit Ethernet ports. All the Gigabit Ethernet ports use GBIC connectors. You can use any of the following GBICs in these connectors:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-LX70



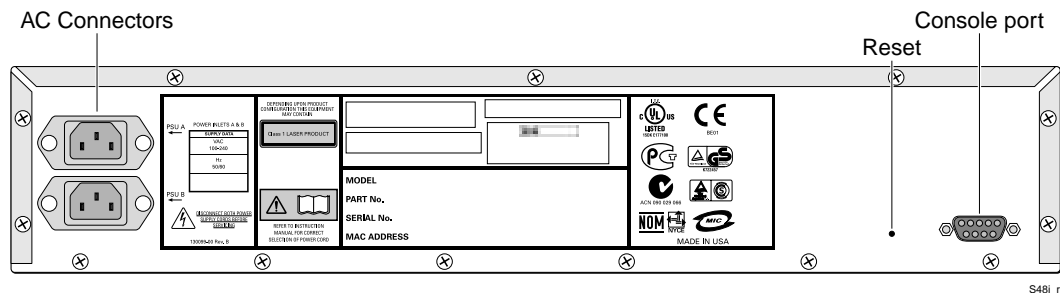
*Note: See Table 1-4 in Chapter 1 information about supported GBIC types and distances.*



*Note: See “Summit1i, Summit5i, Summit7i, Summit48i, and Summit48si Switch LEDs,” for information on LED activity.*

# Summit48i Switch Rear View

Figure 4-12 shows the rear view for the Summit48i switch.



**Figure 4-12:** Rear view of the Summit48i switch

## Power Sockets

The Summit48i switch supports up to two power supplies. Each power supply has its own power socket. When a second power supply is installed and connected to a second independent power source, both provide a redundant, load-shared power source to the Summit48i switch. If one of the power sources or power supplies fails, the second power supply provides all power needs which ensures uninterrupted network operation. The switch also:

- Sends a message to the syslog to indicate which power supply failed
- Sends an SNMP trap to your network management station



*Note: Summit48i switch power supplies must only be serviced by personnel trained by Extreme Networks.*

## Serial Number

Refer to the serial number when you contact Extreme Networks technical support.

## MAC Address

This label shows the unique Ethernet MAC address that Extreme Networks has assigned to the device.

## Reset Button

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

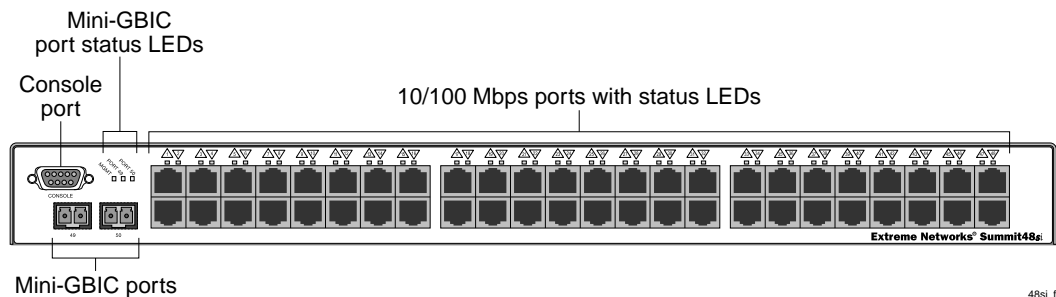
## Console Port

Use the console port (9-pin, “D” type connector) to attach a terminal and access the CLI via a serial connection. Use the console port for local management.

## Summit48si Switch Front View

The Summit48si switch is 1U in height and has 48 autosensing 10BASE-T/100BASE-TX ports and 2 mini-GBIC ports with LC connectors.

Figure 4-13 shows the front view of the Summit48si switch.



**Figure 4-13:** Front view of Summit48si switch

## Mini-GBIC Ports

The Summit48si switch has two unpopulated Extreme mini-GBIC ports using LC connectors. You can use the 1000BASE-SX mini-GBIC or the 1000BASE-LX mini-GBIC in the Summit48si.



*Note: See Table 1-2 and Table 1-3 in Chapter 1 for information about 1000BASE-SX and 1000BASE-LX mini-GBIC specifications.*

## Console Port

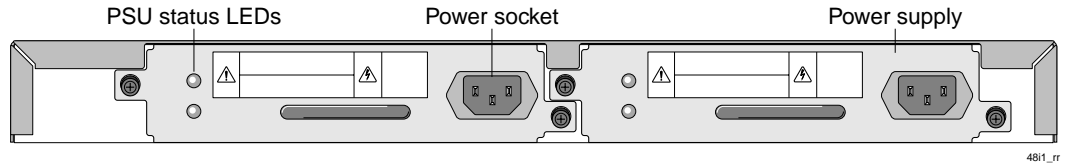
Use the console port (9-pin, “D” type connector) to attach a terminal and access the CLI via a serial connection. Use the console port for local management.



*Note: See “Summit1i, Summit5i, Summit7i, Summit48i, and Summit48si Switch LEDs,” for information on LED activity.*

# Summit48si Switch Rear View

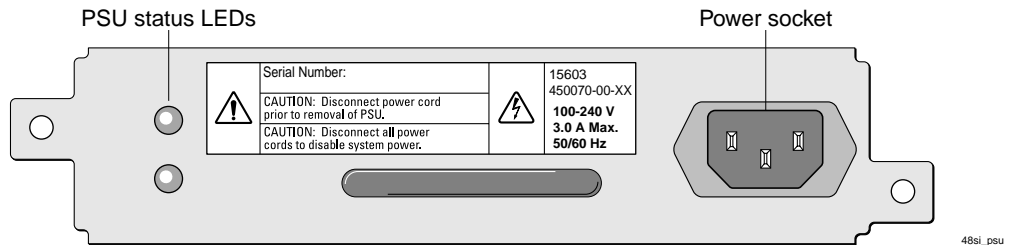
Figure 4-14 shows the rear view for the Summit48si switch.



**Figure 4-14:** Rear view of the Summit48si switch

## Power Supplies

The Summit48si switch supports two hot-insert power supplies, shown in Figure 4-15, with one power supply preinstalled at the factory. You can remove or install Summit48si power supplies—one at a time—without interrupting operation, and each power supply has its own power socket, which allows you to connect independent power sources for each power supply. One functioning power supply must always be installed. Two power supplies operate in a load-sharing manner and increase the reliability of the switch.



**Figure 4-15:** Summit48si power supply



*Note: See Chapter 5 for information about removing and installing power supplies.*

If one of the power supplies fails, or if source power to one of the power supplies fails, the second power supply takes over, ensuring uninterrupted network operation. The switch also does the following:

- Send a message to the syslog telling you which power supply failed
- Send an SNMP trap to your network management software

Summit48si Switch LEDs

Table 4-1 describes the light emitting diode LED activity on Summit48si switch.

Table 4-1: Switch LED Activity for the Summit48si

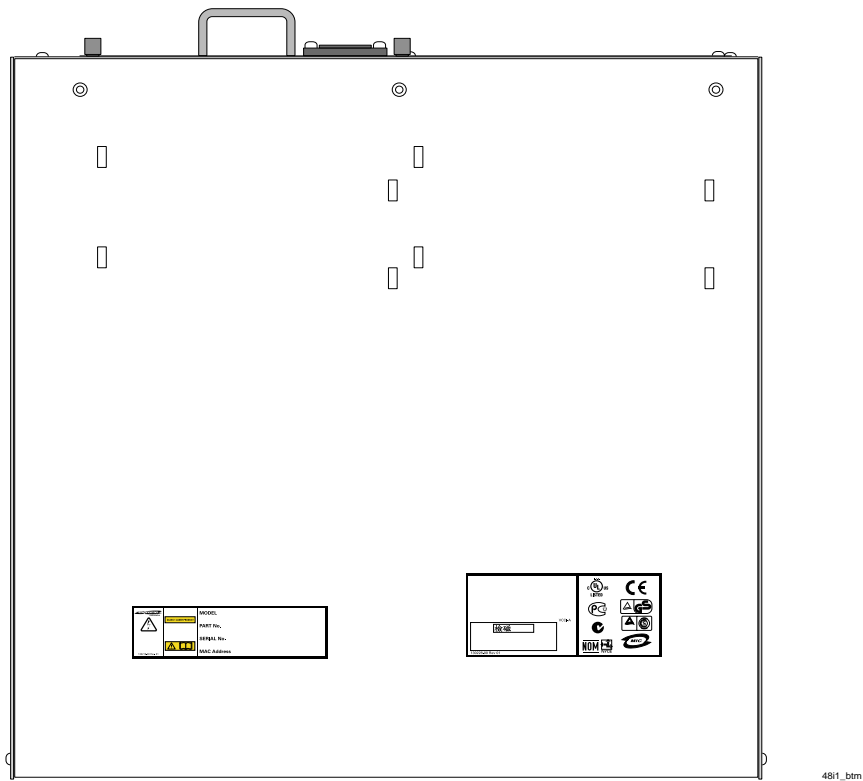
LED	Color	Indicates
<b>MGMT LED</b>		
	Green blinking	
	■ Slow	The switch is operating normally.
	■ Fast	Power On Self Test (POST) or software download in progress.
	Amber	The switch has failed its POST or is experiencing an overheat or fan failure.
<b>Port Status LEDs</b>		
	Green	Link is present; port is enabled.
	Amber	Frames are being transmitted/received on this port.
	Green blinking	Link is present; port is disabled.
	Off	Link is not present.
<b>100/1000 Mbps Speed LEDs</b>		
	Green	1000 Mbps
	Off	100 Mbps

Reset Button

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

Summit48si Switch Bottom View

Figure 4-16 shows the bottom view for the Summit48si switch.



**Figure 4-16:** Bottom view of the Summit48si switch

## Serial Number

Refer to the serial number when you contact Extreme Networks technical support.

## MAC Address

This label shows the unique Ethernet MAC address that Extreme Networks has assigned to the device.



*Note: The label that indicates country and safety certifications for the Summit48si switch is located on the bottom of the switch.*

# Summit1i, Summit5i, Summit7i, Summit48i, and Summit48si Switch LEDs

Table 4-2 describes the LED activity on the Summit1i, Summit5i, Summit7i, Summit48i, and Summit48si switches.

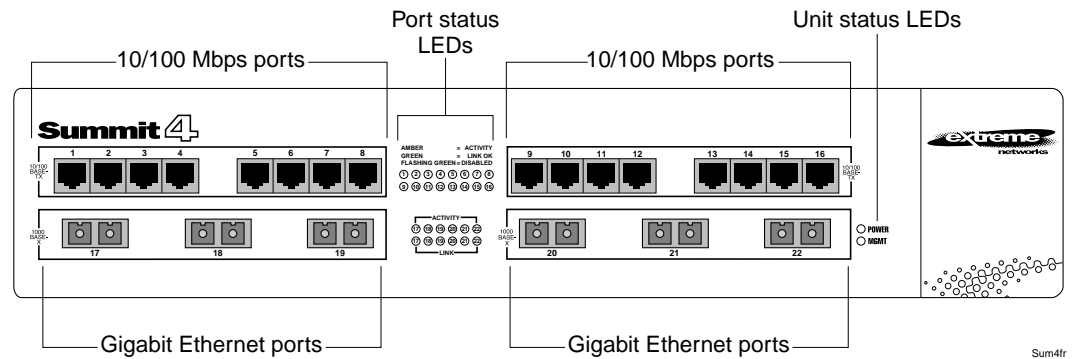
**Table 4-2:** Switch LED Activity for the Summit1i, Summit5i, Summit7i, Summit48i, and Summit48si

LED	Color	Indicates
<b>Unit Status LEDs</b>		
PSU A, PSU B (all except Summit48si)	Green	The indicated power supply unit (PSU) is powered up.
	Amber	The indicated PSU has a failure.
	Green/Amber blinking	The AC power cord is not inserted correctly.
	Off	The PSU is not receiving power or no PSU is present.
MGMT	Green blinking	
	■ Slow	The switch is operating normally.
	■ Fast	Power On Self Test (POST) or software download in progress.
	Amber	The switch has failed its POST or is experiencing an overheat or fan failure.
<b>Port Status LEDs</b>		
	Green	Link is present; port is enabled.
	Amber	Frames are being transmitted/received on this port.
	Green blinking	Link is present; port is disabled.
	Off	Link is not present.
<b>100/1000 Mbps Speed LEDs</b>		
	Green	1000 Mbps
	Off	100 Mbps
<b>10/100 Management Port LED (Summit5i and Summit7i)</b>		
	Green	Link is present.
	Amber	Frames are being transmitted.
	Off	Link is not present.

# Summit4 Switch Front View

The Summit4 switch is 2U in height and has 16 autosensing 10BASE-T/100BASE-TX ports with RJ-45 connectors and 6 Gigabit Ethernet ports with SC connectors. The Gigabit Ethernet ports support 1000BASE-SX over multimode fiber-optic cable.

Figure 4-17 shows the front view of the Summit4 switch.



**Figure 4-17:** Front view of the Summit4 switch



*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*

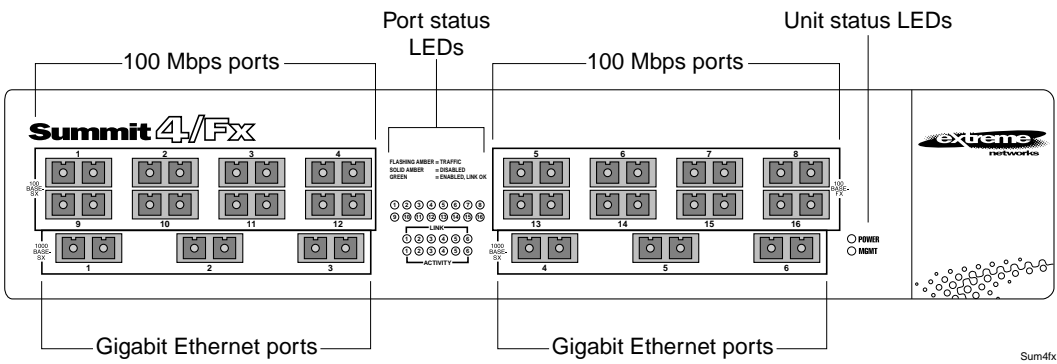


*Note: See “Summit4, Summit24, and Summit48 Switch LEDs,” on page 4-29 for information on LED activity.*

# Summit4/FX Switch Front View

The Summit4/FX switch is 2U in height and has 16 100BASE-FX ports and 6 Gigabit Ethernet ports. The Gigabit Ethernet ports support 1000BASE-SX over multimode fiber-optic cable.

Figure 4-18 shows the front view of the Summit4/FX switch.



**Figure 4-18:** Front view of the Summit4/FX switch



*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*

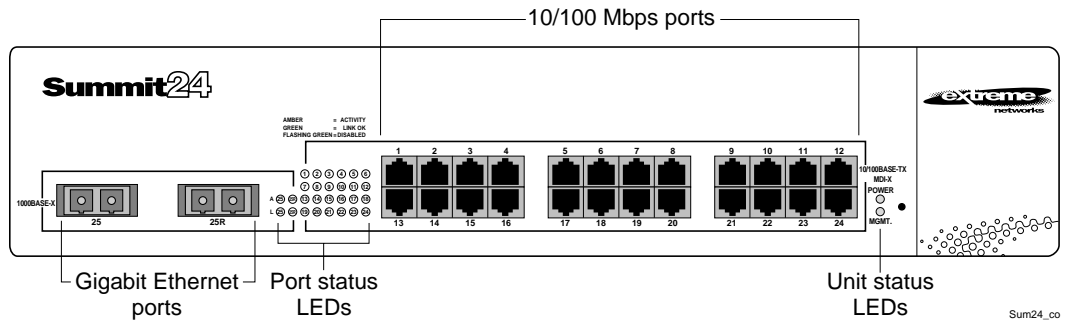


*Note: See “Summit4, Summit24, and Summit48 Switch LEDs,” on page 4-29 for information on LED activity.*

# Summit24 Switch Front View

The Summit24 switch is 2U in height and has 24 autosensing 10BASE-T/100BASE-TX ports with RJ-45 connectors and 1 Gigabit Ethernet port and 1 redundant Gigabit Ethernet port with standard SC connectors.

Figure 4-19 shows the front view of the Summit24 switch.



**Figure 4-19:** Front view of the Summit24 switch



*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*

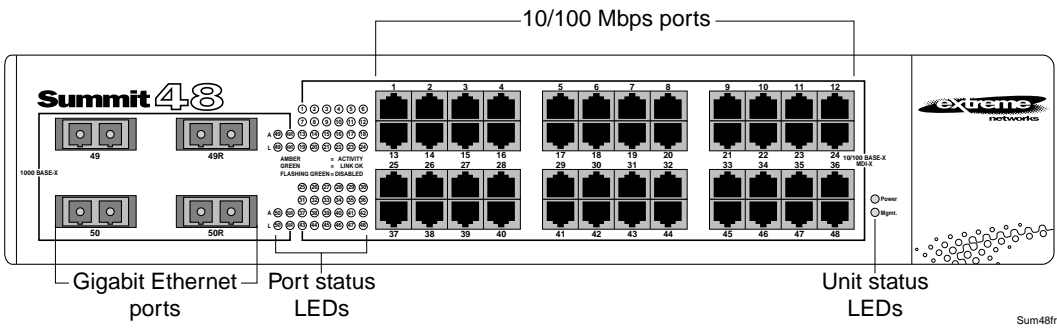


*Note: See “Summit4, Summit24, and Summit48 Switch LEDs,” on page 4-29 for information on LED activity.*

# Summit48 Switch Front View

The Summit48 switch is 2U in height and has 48 autosensing 10BASE-T/100BASE-TX ports with RJ-45 connectors and 2 Gigabit Ethernet ports and 2 redundant Gigabit Ethernet ports with SC connectors. All the Gigabit Ethernet ports use SC connectors so that you can attach GBICs that fit your cabling needs.

Figure 4-20 shows the front view of the Summit48 switch.



**Figure 4-20:** Front view of the Summit48 switch



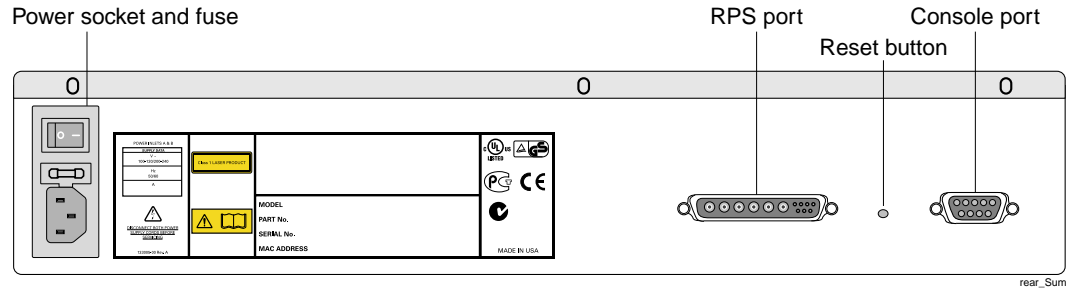
*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*



*Note: See “Summit4, Summit24, and Summit48 Switch LEDs,” on page 4-29 for information on LED activity.*

# Summit4, Summit24, and Summit48 Switch Rear View

Figure 4-21 shows the rear view for the Summit4, Summit4/FX, Summit24, and Summit48 switches.



**Figure 4-21:** Rear view of the Summit4, Summit24, and Summit48 switch

## Power Socket

The Summit switch automatically adjusts to the supply voltage. The power supply operates down to 90 V. The fuse is suitable for both 110 VAC and 220-240 VAC operation.

## Serial Number

Refer to the serial number when you contact Extreme Networks technical support.

## Console Port

Use the console port (9-pin, “D” type connector) to attach a terminal and access the CLI via a serial connection. Use the console port for local management.

## Redundant Power Supply Port

The redundant power supply (RPS) port is used to connect to a Summit RPS. The Summit RPS provides a redundant, load-shared power source to the Summit. If the primary power source for the switch fails, the RPS takes over, ensuring uninterrupted network operation.

When connected to a Summit RPS, the Summit switch can provide status on power and fan operation of the RPS through SNMP, the command-line interface, and the Web interface.

The Summit RPS can simultaneously provide power for up to two Summit switches.

## **MAC Address**

This label shows the unique Ethernet MAC address that Extreme Networks has assigned to the device.

## **Reset Button**

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

# Summit4, Summit24, and Summit48 Switch LEDs

Table 4-3 describes the LED activity on the Summit4, Summit4/FX, Summit24, and Summit48 switches.

**Table 4-3:** Switch LED Activity for the Summit4, Summit24, and Summit48

LED	Color	Indicates
Power	Green	The Summit switch is powered up.
	Yellow	The Summit switch is indicating a power failure, overheat, or fan failure.
MGMT	Green blinking	
	■ Slow	The Summit switch is operating normally.
	■ Fast	Power On Self Test (POST) or software download is in progress.
	Yellow	The Summit has failed its POST.
<b>10/100 Mbps Port Status LEDs</b>		
(all except Summit4/FX)	Green	Link is present; port is enabled.
	Amber	Frames are being transmitted and received on this port.
	Green blinking	Link is present; port is disabled.
	Off	Link is not present.
(Summit4/FX only)	Green	Link is present; port is enabled.
	Amber blinking	Frames are being transmitted and received on this port.
	Amber	Link is present; port is disabled.
	Off	Link is not present.
<b>Gigabit Ethernet Port Status LEDs</b>		
Activity	Yellow	Frames are being transmitted and received on this port.
	Off	No activity on this port.
Link	Green	Link is present; port is enabled for full-duplex operation.
	Green blinking	Link is present; port is disabled.
	Off	Link is not present.

# Summit24e2 Switch Front View

The Summit24e2 switch is 1U in height and has 24 autosensing 10BASE-T/100BASE-TX ports using RJ-45 connectors and provides either two unpopulated GBIC ports or two fixed 1000BASE-T ports.


Figure 4-22 shows the front view of the Summit24e2 switch.



Figure 4-22: Front view of the Summit24e2 switch

## Console Port

Use the console port (9-pin, “D” type connector) to attach a terminal and access the CLI via a serial connection. Use the console port for local management.

 *Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*

# Summit24e2 Switch Rear View

Figure 4-23 shows the rear view of the Summit24e2 switch.

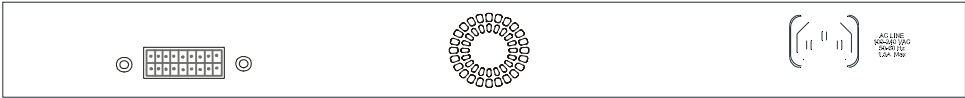


Figure 4-23: Rear view of the Summit24e2 switch

## Power Socket

The Summit24e2 switch automatically adjusts to the supply voltage. The power supply operates down to 100 V.

# Summit24e2 Switch LEDs

Table 4-4 describes the light emitting diode (LED) activity on the Summit24e2 switch.

**Table 4-4:** Summit24e2 Switch LED Activity

<b>Power</b>		
	<b>Color</b>	<b>Indicates</b>
	Green	The switch is operating normally.
	Amber	The switch has failed its POST.
<b>Console</b>		
	<b>Color</b>	<b>Indicates</b>
	Green	Switch is being managed through console port.
	Off	Switch is not being managed through console port.
<b>Link/ACK</b>		
	<b>Color</b>	<b>Indicates</b>
	Green	Link is present.
	Green blinking	Link is present; switch is transmitting or receiving data.
	Off	Link is not present.

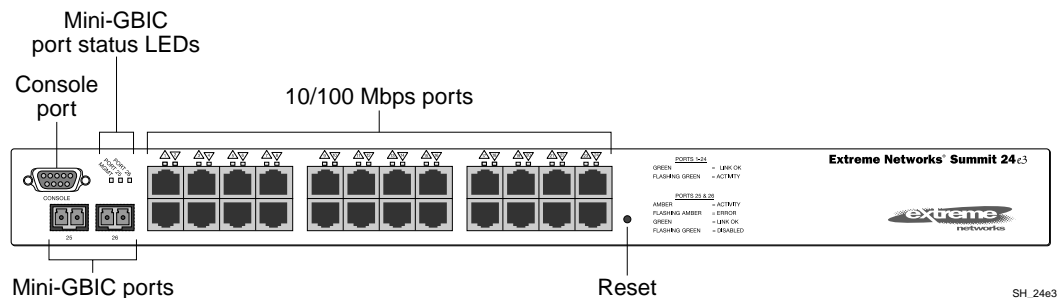


*Note: For more information about configuring and using the Summit24e2 switch, see the Summit24e2 Installation and User Guide.*

## Summit24e3 Switch Front View

The Summit24e3 switch is 1U in height and has 24 autosensing 10BASE-T/100BASE-TX ports using RJ-45 connectors and 2 mini-GBIC ports using LC connectors.

Figure 4-24 shows the front view of the Summit24e3 switch.



**Figure 4-24:** Front view of the Summit24e3 switch

### Mini-GBIC Ports

The Summit24e3 switch has two unpopulated Extreme mini-GBIC ports using LC connectors. You can use the 1000BASE-SX mini-GBIC or the 1000BASE-LX mini-GBIC in the Summit24e3 switch.



*Note: See Table 1-2 and Table 1-3 in Chapter 1 for information about 1000BASE-SX and 1000BASE-LX mini-GBIC specifications.*

### Console Port

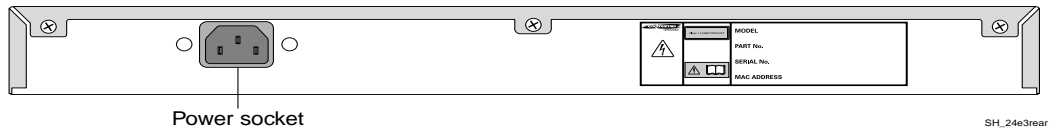
Use the console port (9-pin, “D” type connector) to attach a terminal and access the CLI via a serial connection. Use the console port for local management.

### Reset Button

Use the reset button to cycle the switch down and bring the switch back up without powering off the switch. Your saved switch configuration information is not lost; unsaved switch configurations are lost. Use a non-conductive tool to push the reset button.

# Summit24e3 Switch Rear View

Figure 4-25 shows the rear view of the Summit24e3 switch.



**Figure 4-25:** Rear view of the Summit24e3 switch

## Power Socket

The Summit24e3 switch automatically adjusts to the supply voltage. The power supply operates down to 90 V.

## Serial Number

Refer to the serial number when you contact Extreme Networks technical support.

## MAC Address

This label shows the unique Ethernet MAC address that Extreme Networks has assigned to the device.



*Note: The label that indicates country and safety certifications for the Summit24e3 switch is located on the bottom of the switch.*

# Summit24e3 Switch LEDs

Table 4-5 describes the LED activity on the Summit24e3 switch.

**Table 4-5:** Summit24e3 Switch LED Activity

Unit Status LED (MGMT LED)	
Color	Indicates
Green blinking	The switch is operating normally.
Amber	The switch has failed its POST.
10/100 Mbps Port Status LEDs	
Color	Indicates
Green	Link is present; port is enabled.
Green blinking	Link is present; there is activity.
Off	Link is not present or the port is disabled.
Mini-GBIC Port Status LEDs	
Color	Indicates
Amber	Frames are being transmitted and received on this port.
Amber blinking	A non-supported GBIC is installed on this port.
Green	Link is present; port is enabled for full-duplex operation.
Green blinking	Link is present; port is disabled.
Off	Link is not present.



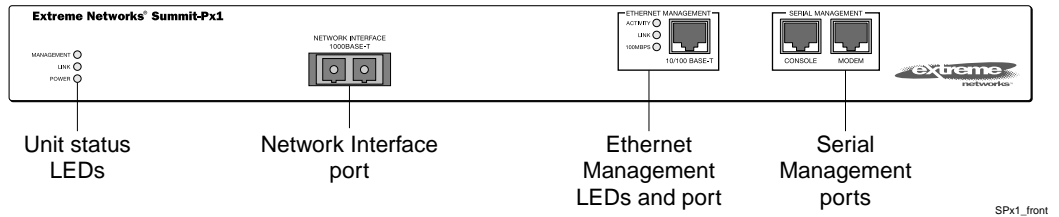
*Note: For more information about configuring and using the Summit24e3 switch, see the Summit24e3 Installation and User Guide.*

# SummitPx1 Application Switch Front View

The SummitPx1 application switch is 1U in height and has the following four ports:

- Network Interface port is a Gigabit Interface Connector (GBIC) with an SC connector used to connect the application switch to your local network.
- 1000BASE-Tx Ethernet Management port with an RJ-45 connector is a 10/100 Mbps Ethernet connection used for out-of-band management.
- Serial Management ports have two serial RJ-45 connectors. Use the console port to connect a terminal for local out-of-band-management. Use the modem port for remote out-of-band management.

Figure 4-26 shows the front view of the SummitPx1 application switch.



**Figure 4-26:** Front view of the SummitPx1 application switch

## GBIC Network Interface

The Network Interface port is a Gigabit Interface Connector (GBIC) used to connect the application switch to your local network.

## Ethernet Management Port

Use the Ethernet management port to plug an Ethernet cable directly from your laptop into the switch for out-of-band management. This provides you with direct access into the switch and allows you to view and locally manage the switch configurations.

See Chapter 1 for more information about the management port.

## Serial Management Console Port

Use the console port to connect a terminal for local out-of-band management. The console operates at 9600 baud, 8 data bits, no parity, one stop bit (8-N-1) with no hardware flow control.

The included DB-9 adapter is used to connect the console to a PC serial port, using a straight (1-8, 1-8) cable, such as a standard category 3 or category 5 Ethernet cable.

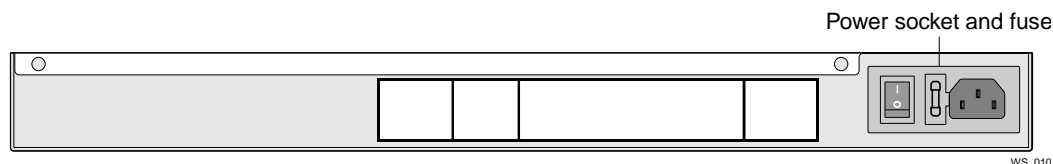
If you are wiring the console port to a console server, such as a Cisco Systems 2511 Access Server, you must use a null modem cable (1-8, 8-1).

## Serial Management Modem Port

The modem port (RJ-45 connector) has the same pin-outs as the console port. Use the modem port for remote out-of-band management.

# SummitPx1 Application Switch Rear View

Figure 4-27 shows the rear view of the SummitPx1 application switch.



**Figure 4-27:** Rear view of the SummitPx1 application switch

## Power Socket

The SummitPx1 application switch automatically adjusts to the supply voltage. The power supply operates down to 90 VAC. The fuse is suitable for both 110 VAC and 220-240 VAC operation.

## Serial Number

Refer to the serial number when you contact Extreme Networks technical support.

## MAC Address

This label shows the unique Ethernet MAC address that Extreme Networks has assigned to the device.

## SummitPx1 Application Switch LEDs

Table 4-6 describes the LED activity on the SummitPx1 application switch.

**Table 4-6:** SummitPx1 Application Switch LED Activity

LED	Color	Indicates
Link	Green	The 1000BASE-T link is operational.
	Yellow flashing	There is activity on this link.
Management	Green flashing	
	■ Slow	The SummitPx1 application switch is operating normally.
	■ Fast	Power On Self Test (POST) in progress.
	Red	The SummitPx1 application switch has failed its POST.
Power	Green	The SummitPx1 application switch is powered up.
	Red	The SummitPx1 application switch is indicating a power or temperature problem.



*Note:* For more information about configuring and using the SummitPx1 switch, see the SummitPx1 Application Switch Installation and Configuration Guide.



# 5

## Summit Switch Installation

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You can mount the Summit switch in a rack or place it free-standing on a tabletop.

This chapter describes:

- Installation procedures for mounting a Summit switch in a rack or in a free-standing environment
- Installation and removal procedures for the Summit48si power supplies



*Caution: Use of controls or adjustments of performance or procedures other than those specified herein can result in hazardous radiation exposure.*



*Warning: Read the safety information in Appendix A thoroughly before installing your Extreme Networks switch. Failure to follow this safety information can lead to personal injury or damage to the equipment.*

### Mounting the Switch in a Rack



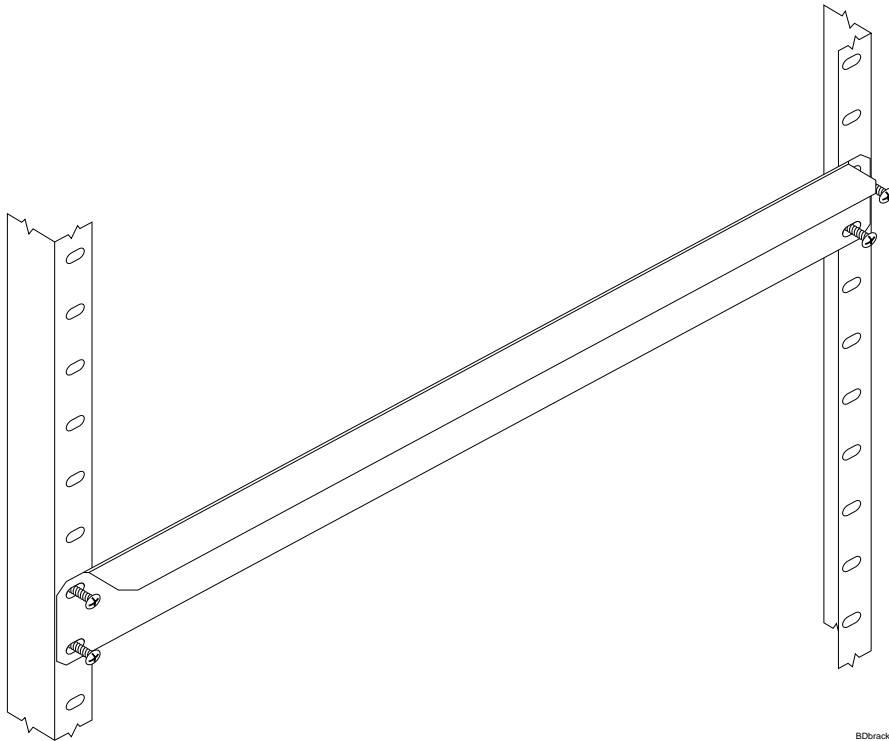
*Caution: Do not use the rack mount kits to suspend the switch under a table or desk, or to attach the switch to a wall.*

To mount the Summit switch in a rack:

- 1 If you are installing a Summit7i switch, mount the helper bracket in the rack, as shown in Figure 5-1. Use four screws (not provided) that are appropriate to your rack type.

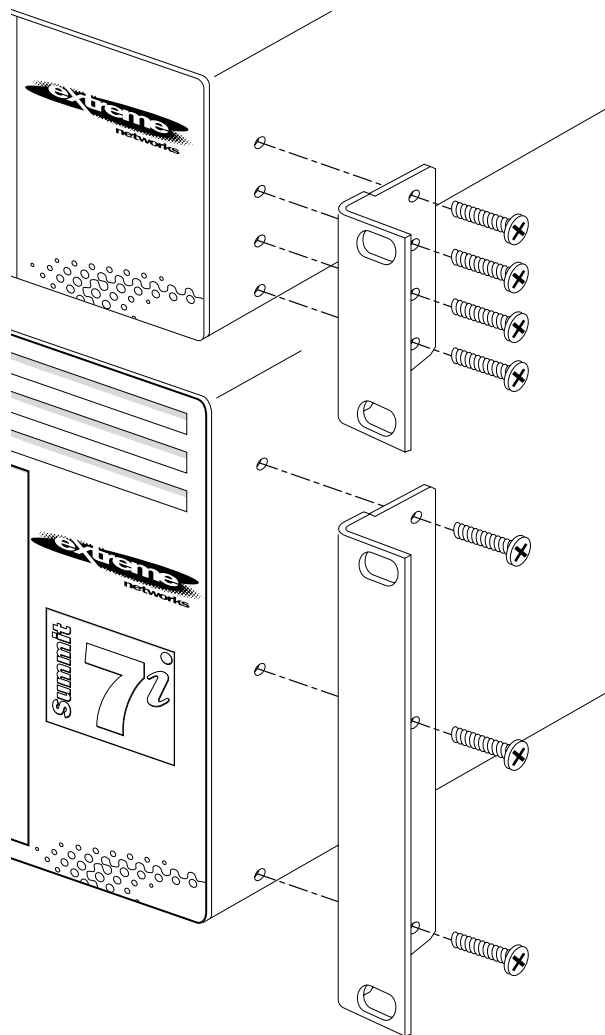


*Note: Only the Summit7i switch uses the helper bracket. The helper bracket is not required to rack mount a Summit1i, Summit5i, Summit48i, Summit48si, Summit4, Summit4/FX, Summit24, Summit48, Summit24e2, Summit24e3, or SummitPx1 switch.*



**Figure 5-1:** Helper bracket for the Summit7i switch

- 2** Place the switch upright on a secure flat surface with the front of the switch facing you.
- 3** Remove the existing screws from the sides of the case (retain the screws for Step 5).
- 4** Place a mounting bracket over the mounting holes on one side of the unit.
- 5** Insert and tighten the screws with a suitable screwdriver, as shown in Figure 5-2.



EW\_rack

**Figure 5-2:** An example of fitting the mounting bracket into the switch

- 6** Repeat steps 3 through 5 for the other side of the switch.
- 7** Insert the switch into the 19-inch (48.26-cm) rack. If you are installing a Summit7i switch, place it on the helper bracket. Ensure that ventilation holes are not obstructed.
- 8** Secure the switch with suitable screws (not provided).

- 9 If you are installing a Summit7i switch, remove the helper bracket after the chassis is secured.
- 10 Connect the Summit switch to a redundant power supply (if applicable).
- 11 To turn on power to the system, connect the AC power cable(s) to the switch and then to the wall outlet(s). For the Summit4, Summit24, and Summit48 switches, turn the on/off switch to the on position.



*Note: The Summit1i, Summit5i, Summit7i, Summit48i, Summit48si, Summit24e3, Summit24e2, and SummitPx1 switches do not have on/off switches.*

## Placing the Switch on a Table or Shelf

The Summit switch comes with four self-adhesive rubber pads. Apply the pads to the underside of the switch by sticking a pad in the marked area at each corner of the switch.

You can place up to four Summit switches on top of one another.

Apply the pads to the underside of each switch, and place a pad at each corner of the switch. Place the switches on top of one another, ensuring that the corners align.

## Removing and Installing Summit48si Power Supplies



*Note: Summit48si power supplies must be serviced by trained service personnel.*



*Note: If you need to power down the switch, remove all of the power cords from the installed power supplies.*

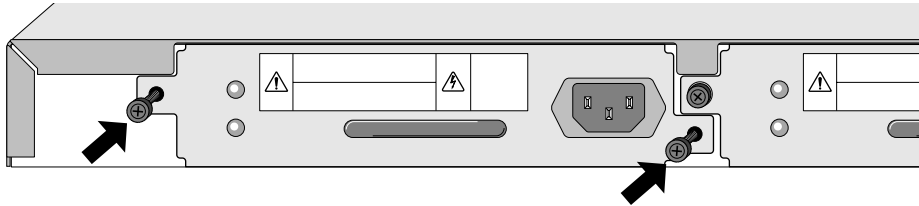
To remove a Summit48si power supply:

- 1 Remove the power cord.



*Caution: Shock hazard.*

- 2 Use a #2 Phillips screwdriver to unscrew the two retaining screws, as shown in Figure 5-3.



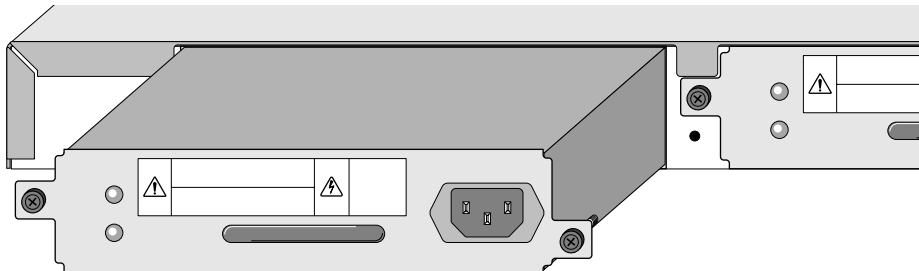
4811\_01

**Figure 5-3:** Removing the retaining screws from the Summit48si power supply

- 3 Use the handle to slowly pull the power supply towards you, as shown in Figure 5-4.



*Warning: Do not insert your fingers or hands into the empty power supply bay.*



4811\_02

**Figure 5-4:** Removing the Summit48si power supply

- 4 If you are not going to install a replacement power supply, cover the power supply bay with the blank faceplate that was originally supplied with the switch. Otherwise, follow the Summit48si power supply installation procedure to install a new power supply.

To install a Summit48si power supply:

- 1 Remove the blank faceplate from the power supply bay.
- 2 Use the handle to gently slide the power supply into the bay.
- 3 Replace and tighten the two captive retaining screws using a #2 Phillips screwdriver.

- 4 To turn the power supply on, connect the AC power cable to the power supply and then to the wall outlet.



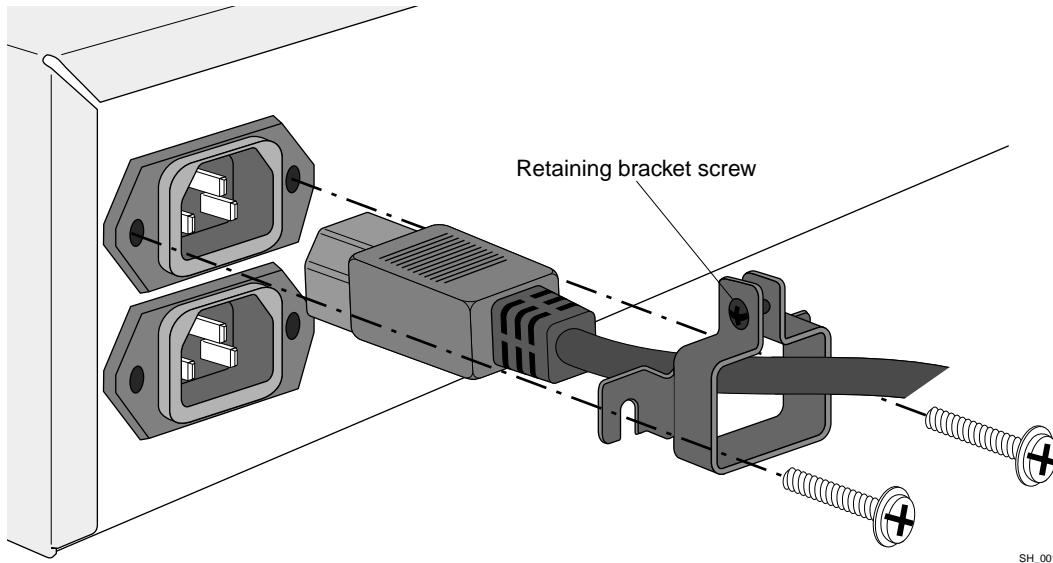
*Warning: Do not plug in the power cord into the power supply unless the power supply is installed.*

- 5 Keep the faceplate and the power supply packaging for future use.

## Installing an AC Power Cord Retaining Bracket

To install an AC power cord retaining bracket:

- 1 Disconnect the power cord from the switch **and** the power source.
- 2 Remove the two retaining screws from the power socket on the rear of the switch using a #2 Phillips screwdriver.  
You will not re-use these screws.
- 3 Slide the retaining bracket over the power cord, as shown in Figure 5-5. If necessary, loosen the retaining bracket screw.



**Figure 5-5:** Attaching the retaining bracket to the power socket

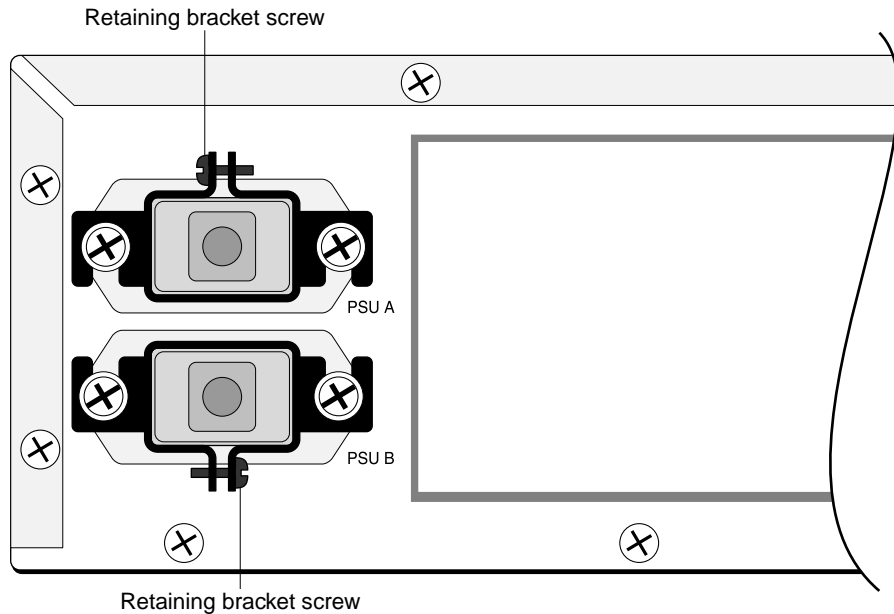
- 4 Connect the power cord to the switch.



*Caution: Do not connect the power cord to the power source at this time.*

- 5 Attach the retaining bracket to the power socket using two of the 6-32 pan-head screws provided, as shown in Figure 5-5.
- 6 Tighten the retaining bracket screw.

If your switch has two power supplies, install the second retaining bracket now by repeating the preceding steps. Align the retaining brackets as shown in Figure 5-6 so that the retaining bracket screws do not interfere with each other.



SH\_002

**Figure 5-6:** Attaching two retaining brackets

- 7 Connect the power cord(s) to the power source.

## Verifying a Successful Installation

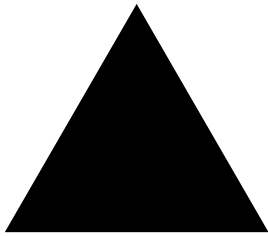
After you supply power to the Summit switch, the switch performs a power-on self test (POST).

During the POST, all ports are temporarily disabled, the packet LED is off, the power LED is on, and the MGMT LED flashes. The MGMT LED flashes until the switch successfully passes the POST.

If the switch passes the POST, the MGMT LED blinks at a slow rate (one blink per second). If the switch fails the POST, the MGMT LED shows a solid yellow light.



*Note: See Chapter 4 for more information about Summit LEDs.*



## Part 4: Alpine Switch

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6

# Alpine 3800 Series Switch Overview

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The Alpine 3800 series switch is a chassis-based, Ethernet service provisioning switch designed for edge and aggregation applications. The Alpine 3800 series switch is flexible and scalable, making it easy for you to meet the changing requirements of your network. The combination of BlackDiamond, Alpine, and Summit switches delivers a consistent end-to-end network solution that provides a nonblocking architecture, wire-speed switching, wire-speed IP routing, and policy-based Quality of Service (QoS).

This chapter describes:

- The features available on the Alpine 3800 series switch
- The components of the Alpine 3800 series switch
- The importance of following safety information

## Summary of Features

The features of the Alpine 3800 series switch include:

- A 9-slot chassis that can be populated with up to eight input/output (I/O) modules and one Switch Management Module (SMMi) (Alpine 3808)
- A 5-slot chassis that can be populated with up to four I/O modules and one SMMi (Alpine 3804)
- A 3-slot chassis that can be populated with up to three I/O modules (Alpine 3802)
- I/O modules that are hot-swappable, and include Gigabit Ethernet or 10/100 Mbps Ethernet ports

- Redundant, load-sharing, hot-swappable power supplies (Alpine 3808 and Alpine 3804)
- Field-replaceable, hot-swappable fan tray (Alpine 3808 and Alpine 3804)
- Fully nonblocking operation
  - All ports transmit and receive packets at wire speed
- Autonegotiation for half-duplex or full-duplex operation on 10/100 Mbps ports
- Load-sharing on multiple ports
- VLANs, including support for IEEE 802.1Q
- STP (IEEE 802.1D) with multiple STP domains
- Policy-Based QoS
- Wire-speed IP routing
- IP multinetting
- DHCP/BOOTP relay
- RIP version 1 and RIP version 2
- OSPF routing protocol
- IPX routing, including RIP and SAP
- Wire-speed IP multicast routing support
- Internet Group Multicast Protocol (IGMP) and IGMP snooping
- DVMRP
- IGMP snooping to control IP multicast traffic
- Console (RS-232) CLI connection
- Telnet CLI connection
- ExtremeWare VistaWeb-based management interface
- SNMP support
- Dedicated 10BASE-T/100BASE-TX port for out-of-band management via CLI, ExtremeWare Vista, or SNMP

## Port Connections

The Alpine 3800 series switches support the following port configurations that are available on the different Alpine I/O modules as described in Table 6-1.



*Caution: Modules that use SX, LX, and LX70 interfaces contain Class 1 laser devices. Invisible laser radiation can occur when open. Avoid direct eye exposure to beam.*

**Table 6-1:** Port Configurations Available on Alpine I/O Modules

Module	Ethernet Ports					
	10BASE-T/ 100BASE-TX	100BASE-TX/ 1000BASE-T	GBIC	1000BASE-SX	100BASE-FX	OTHER
GM-4Ti		4				
GM-4Xi			4 <sup>1</sup>			
GM-4Si				4		
GM-WDMi						1 WDM <sup>2</sup>
FM-32Ti	32					
FM-24Ti	24					
FM-24SF <sub>i</sub>					24	
FM-24MF <sub>i</sub>					24	
FM-8Vi						8 VDSL <sup>3</sup>
WM-4T1i	2					4 T1
WM-4E1i	2					4 E1
WM-1T3i	2					1 T3

1 The GM-4Xi supports 1000BASE-SX, 1000BASE-LX, and 1000BASE-LX70.

2 The GM-WDMi supports four Gigabit Ethernet channels over single fiber using wavelength division multiplexing.

3 The FM-8Vi has eight internal loopback ports for rate shaping. Module supports 10BASE-S.

## Switch Components

There are three models in the Alpine 3800 series: the Alpine 3808 switch, the Alpine 3804 switch, and the Alpine 3802 switch. This section describes the three Alpine models.

## Alpine 3808 Switch

The Alpine 3808 switch consists of the following components:

- One 9-slot chassis with backplane
- Eight I/O module slots, labeled 1 through 8
- One SMMi slot
- One or two power supplies (accessed from the front of the unit)
- One fan tray (accessed from the front of the unit)
- One electromagnetic discharge (ESD) wrist strap connector

## Alpine 3804 Switch

The Alpine 3804 switch consists of the following components:

- One 5-slot chassis with backplane
- Four I/O module slots, labeled 1 through 4
- One SMMi slot
- One or two power supplies (accessed from the rear of the unit)
- One fan tray (accessed from the front of the unit)
- One electromagnetic discharge (ESD) wrist strap receptacle

## Alpine 3802 Switch

The Alpine 3802 switch consists of the following components:

- One 3-slot chassis
- Three I/O module slots, labeled 1 through 3
- One or two preinstalled power supplies
- One fan tray (not user removable)
- One electromagnetic discharge (ESD) wrist strap receptacle



*Caution: The Alpine 3802 switch has an integrated Switch Management Module (SMMi). The integrated Switch Management Module is not hot-swappable or user removable. Do not attempt to remove the integrated Switch Management Module. Contact Extreme Networks Customer Support if you experience problems.*

## Power Supply

The Alpine 3800 series switch supports both AC and DC power supplies, except where noted. If two power supplies are installed in the switch, both installed power supplies must be of the same type. The AC power supplies auto-sense for 110 VAC and 220 VAC power. The DC power supplies require -40 VDC input line voltage.

The Alpine 3800 series switch supports the following power supply configurations:

**Table 6-2:** Supported Power Supplies for the Alpine 3800 Series Switch

Switch Model	AC power supply	DC power supply	Hot-swappable
Alpine 3808	Up to two AC power supplies can be installed.	Up to two DC power supplies can be installed.	Yes
Alpine 3804	Up to two AC power supplies can be installed.	Up to two DC power supplies can be installed.	Yes
Alpine 3802 <sup>1</sup>	Up to two AC power supplies can be installed.	Not currently supported.	No

<sup>1</sup> If you have one power supply installed in the Alpine 3802 switch, it must be installed in the lower power supply tray (PSU A).

## Safety Information

All installation and removal to Alpine 3800 series switch modules, fan tray, and power supplies should be performed by trained service personnel only.



*Warning: Read the safety information in Appendix A thoroughly before installing your Extreme Networks switch. Failure to follow this safety information can lead to personal injury or damage to the equipment.*





# Alpine 3800 Series Switch Chassis

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There are three models in the Alpine 3800 series: the Alpine 3808 switch, the Alpine 3804 switch, and the Alpine 3802 switch.

This chapter describes:

- The architecture and front and rear views of each Alpine 3800 series chassis
- The supported port configurations for each Alpine 3800 series chassis
- The installation and removal procedures for the Alpine 3800 series chassis

## Alpine 3800 Series Architecture

This section describes and shows the architecture of the Alpine 3800 series chassis. For each chassis, the front view shows an example of a completely installed chassis with optional I/O modules that you can install in the chassis. The rear view shows the back of the chassis.

### Alpine 3808 Switch Front View

The Alpine 3808 switch consists of the following components:

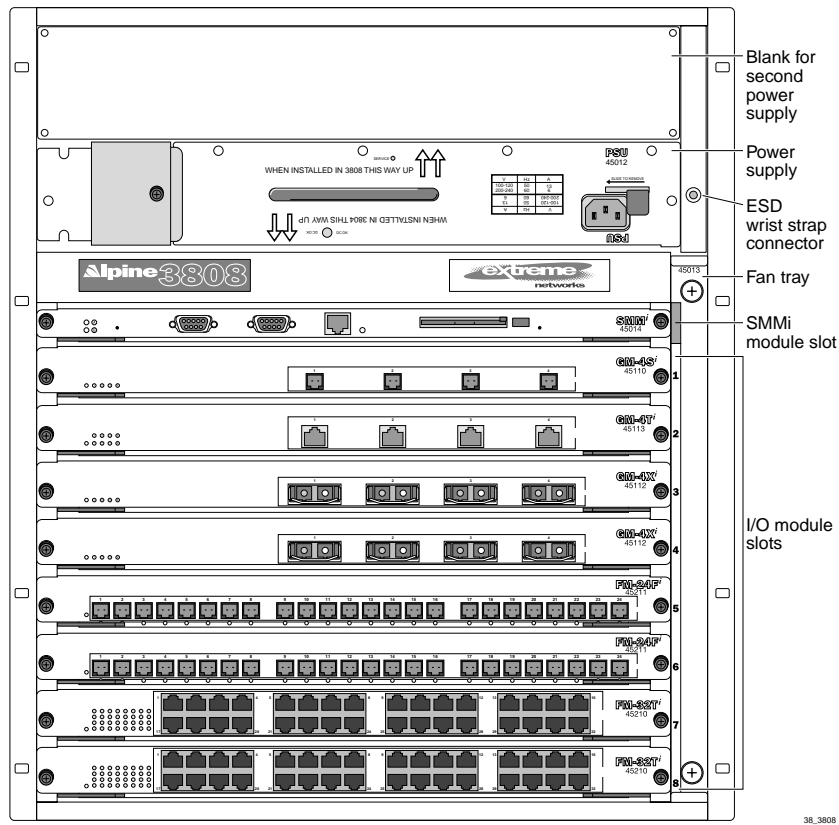
- One 9-slot chassis with backplane
- Eight I/O module slots, labeled 1 through 8
- One SMMi slot

- One or two power supplies (accessed from the front of the unit)
- One fan tray
- One electromagnetic discharge (ESD) wrist strap connector

The Alpine 3808 switch can support the following number of ports and types of port configurations:

- Up to 256 switched 10BASE-T/100BASE-TX Ethernet ports
- Up to 192 switched 100BASE-FX Fast Ethernet ports
- Up to 32 switched Gigabit Ethernet ports
- Up to 32 switched T1 ports
- Up to 32 switched E1 ports
- Up to 48 switched Ethernet over VDSL ports
- Up to 8 switched T3 ports

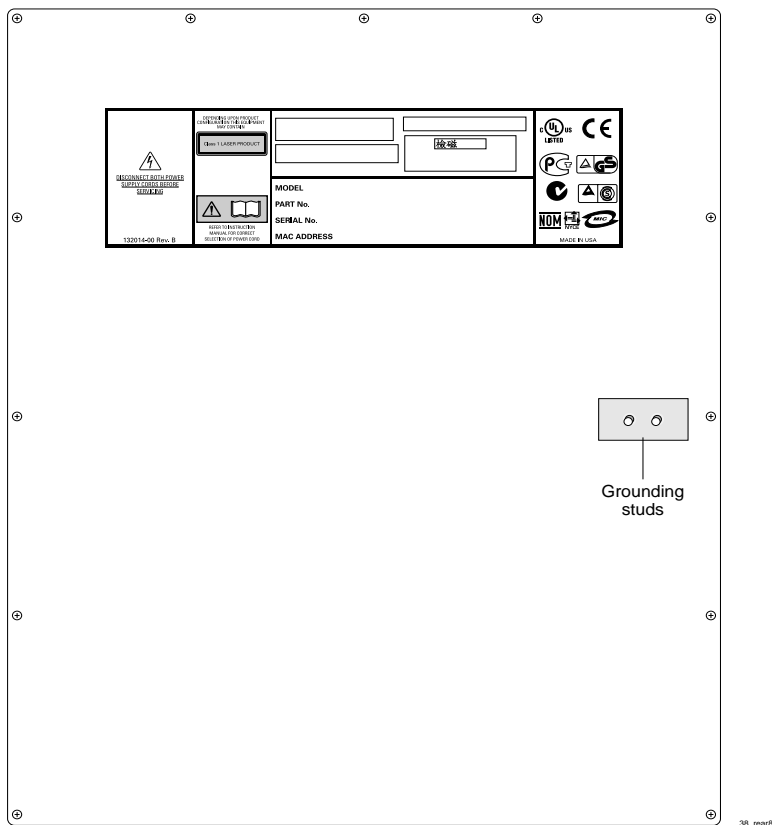
Figure 7-1 shows the Alpine 3808 chassis installed with one required SMMi and eight optional I/O modules.



**Figure 7-1:** Front view of the Alpine 3808 switch with sample I/O modules installed

## Alpine 3808 Switch Rear View

Figure 7-2 shows the rear view of the Alpine 3808 switch.



**Figure 7-2:** Rear view of the Alpine 3808 switch

The rear view of the Alpine 3808 switch provides:

- Access to the grounding studs
- The chassis serial number
- The Ethernet MAC address of the switch
- Symbols of safety certification

## Alpine 3804 Switch Front View

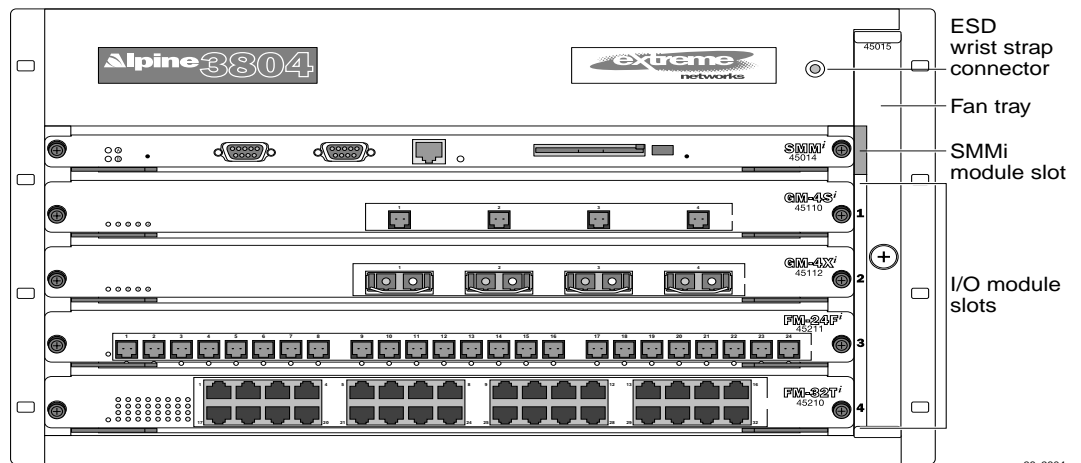
The Alpine 3804 switch consists of the following components:

- One 5-slot chassis with backplane
- Four I/O module slots, labeled slots 1 through 4
- One SMMi slot
- One or two power supplies (accessed from the rear of the unit)
- One fan tray
- One electromagnetic discharge (ESD) wrist strap connector

The Alpine 3804 switch can support the following number of ports and types of port configurations:

- Up to 128 switched 10BASE-T/100BASE-TX Ethernet ports
- Up to 96 switched 100BASE-FX Fast Ethernet ports
- Up to 16 switched Gigabit Ethernet ports
- Up to 16 switched T1 ports
- Up to 16 switched E1 ports
- Up to 32 switched Ethernet over VDSL ports
- Up to 4 switched T3 ports

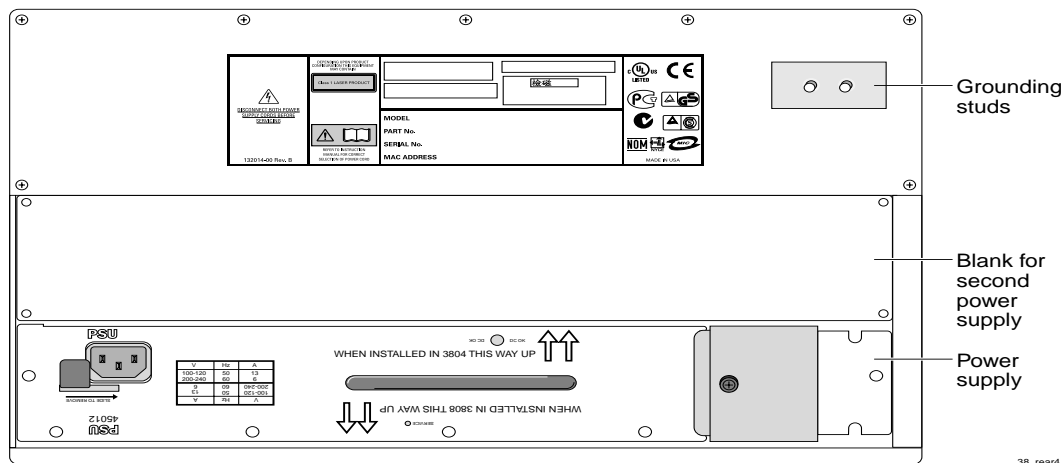
Figure 7-3 shows the Alpine 3804 chassis installed with one required SMMi and five optional I/O modules.



**Figure 7-3:** Front view of the Alpine 3804 switch with sample I/O modules installed

## Alpine 3804 Switch Rear View

Figure 7-4 shows the rear view of the Alpine 3804 switch.



**Figure 7-4:** Rear view of the Alpine 3804 switch

The rear view of the Alpine 3804 switch provides:

- Access to the power supply
- Access to the grounding studs
- The chassis serial number
- The Ethernet MAC address of the switch
- Symbols of safety certification

## Alpine 3802 Switch Front View

The Alpine 3802 switch consists of the following components:

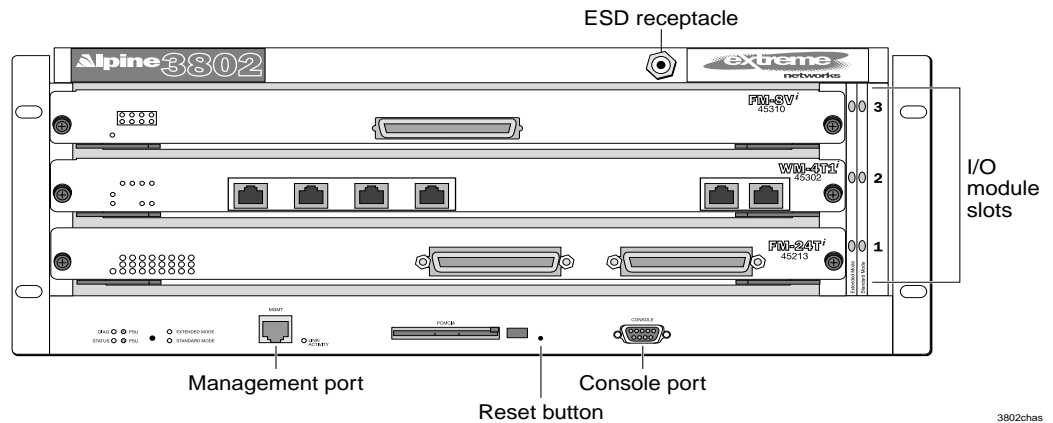
- One 3-slot chassis with backplane
- Three I/O module slots, labeled slots 1 through 3
- One or two preinstalled power supplies
- One fan tray
- One electromagnetic discharge (ESD) wrist strap connector

- Six light emitting diode (LED) displays

The Alpine 3802 switch can support the following number of ports and types of port configurations:

- Up to 64 switched 10BASE-T/100BASE-TX Ethernet ports
- Up to 48 switched 100BASE-FX Fast Ethernet ports
- Up to 8 switched Gigabit Ethernet ports
- Up to 12 switched T1 ports
- Up to 12 switched E1 ports
- Up to 16 switched Ethernet over VDSL ports
- Up to 3 switched T3 ports

Figure 7-5 shows the Alpine 3802 chassis installed with three optional I/O modules.



**Figure 7-5:** Front view of the Alpine 3802 switch with sample I/O modules installed

The Alpine 3802 switch provides up to 16 Gigabits of full-duplex bandwidth and supports all existing Alpine Ethernet I/O modules, including the access modules.

The Alpine 3802 switch operates in three modes:

- Extended— In extended mode, all slots (slots 1, 2, and 3) are enabled. Slot 1 supports all existing Alpine modules (both I/O and Access modules). Slots 2 and 3 support only Alpine access modules.

- **Standard**—In standard mode, only slots 1 and 2 are enabled. Slot 3 is disabled. Slots 1 and 2 support all existing Alpine modules (both I/O and Access modules).
- **Auto**—In auto mode, the switch determines if it is in standard or extended mode depending on the type of modules installed in the chassis or the slot preconfigurations.

You can use the `configure switch {auto | extended | standard}` command to configure the switch to operate in a specific mode. By default, the switch operates in auto mode.



*Note: Slot 3 in the Alpine 3802 can accept Alpine Access I/O modules only. A non-Access I/O module cannot be inserted into slot 3.*

**Alpine 3802 Switch LEDs**

Table 7-1 describes the LED activity of the Alpine 3802 switch.

**Table 7-1:** Alpine 3802 Switch LEDs

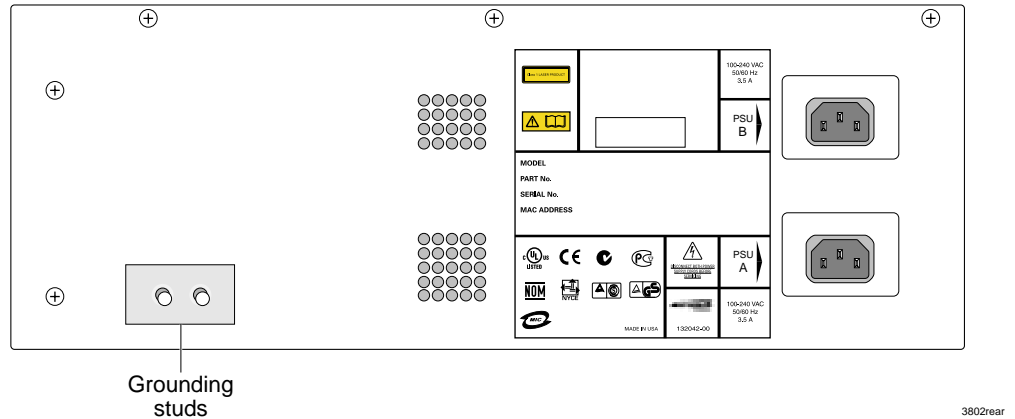
LED	Color	Indicates
DIAG	Green blinking	Power-on Self Test (POST) is running
	Off	Normal operation
STATUS	Green blinking	Normal operation
	Yellow blinking	Critical error, fan failure, or over temperature
	Off	Unit is not receiving power
PSU A, PSU B	Green	Normal operation
	Amber	PSU failure
	Off	PSU not present or not powered
EXTENDED MODE	Green	Extended mode operation
	Off	Not operating in extended mode
STANDARD MODE	Green	Standard mode operation
	Off	Not operating in standard mode



*Note: The Alpine 3802 switch has an integrated Switch Management Module (SMMi). The module is not hot-swappable or user-removable. Do not attempt to remove. Contact Extreme Networks Customer Support if you experience problems.*

## Alpine 3802 Switch Rear View

Figure 7-6 shows the rear view of the Alpine 3802 switch.



**Figure 7-6:** Rear view of the Alpine 3802 switch

- Access to the grounding studs
- The chassis serial number
- The Ethernet MAC address of the switch
- Symbols of safety certification

### Power Sockets

The Alpine 3802 switch supports up to two power supplies. Each power supply has its own power socket. When a second power supply is installed, both provide a redundant, load-shared power supply to the Alpine 3802 switch. If one of the power supplies fails, the second power supply provides all power and ensures uninterrupted network operation.



*Note: Do not attempt to fix a failed power supply; power supplies are not user removable. Alpine 3802 switch power supplies must be installed or removed by trained service personnel only. Contact Extreme Networks Customer Support if you experience problems.*

If you have one power supply installed in the Alpine 3802, it must be installed in the lower power supply tray (PSU A).

## Alpine 3802 Software Enhancements

The Alpine 3802 incorporates software enhancements and new commands to assist you in troubleshooting switch errors and configuring the switch. This section describes the added software features.

### New Error Messages

If you insert a module into the Alpine 3802 that is not allowed in a particular slot, the switch logs the error to the syslog. For example, if you insert a GM-WDMi module in slot 3, the switch logs an error.

### New Command

The Alpine 3802 has three modes of switch operation. You can use the `configure switch {auto | extended | standard}` command to configure the switch to operate in a specific mode. By default, the switch operates in auto mode.

The three modes of switch operation are:

- **Extended mode**—In extended mode, all slots (1, 2, and 3) are enabled. Slot 1 supports all Alpine modules (both I/O and Access modules). Slots 2 and 3 support only Alpine Access modules.

The Extended Mode LED lights when the switch is in extended mode.

- **Standard mode**—In standard mode, only slots 1 and 2 are enabled. Slot 3 is disabled. Slots 1 and 2 support any Alpine module (both I/O and Access modules).

The Standard Mode LED lights when the switch is in standard mode.

- **Auto mode**—In auto mode, the switch determines if it is in standard or extended mode depending on the type of modules installed in the chassis or the slot preconfigurations. If an Alpine I/O module (for example, an FM-32Ti module) is installed or preconfigured in slot 2, the switch operates in standard mode. If an Alpine Access module (for example, a WM-4Ti module) is installed or preconfigured in slots 2 or 3, the switch operates in extended mode.

### Updated Commands

Two commands have been updated to reflect Alpine 3802 specific information and configurations: `show switch` and `show version`.

Use the `show switch` command to display the current switch information, including the mode of switch operation.

Use the `show version` command to display hardware and software versions currently running on the switch as well as the riser card serial number (the riser card supports connection to the I/O slots). Information about the power supplies is not displayed.

## Installing the Chassis

The Alpine 3800 series chassis fits in standard 19-inch (48.26-cm) racks. The Alpine 3808 measures 12 U in height, the Alpine 3804 measures 6 U in height, and the Alpine 3802 measures 4 U in height.

The Alpine 3808 and Alpine 3804 chassis is shipped empty. For your safety, due to the increased weight of the chassis after components are installed and to prevent damage to the equipment, we strongly recommended that you install the power supply and modules after you mount the empty chassis in a rack.

The Alpine 3802 chassis is shipped with a preinstalled power supply and fan tray. For your safety, due to the increased weight of the chassis after components are installed and to prevent damage to the equipment, we strongly recommend that you install the I/O modules after you mount the chassis in a rack.

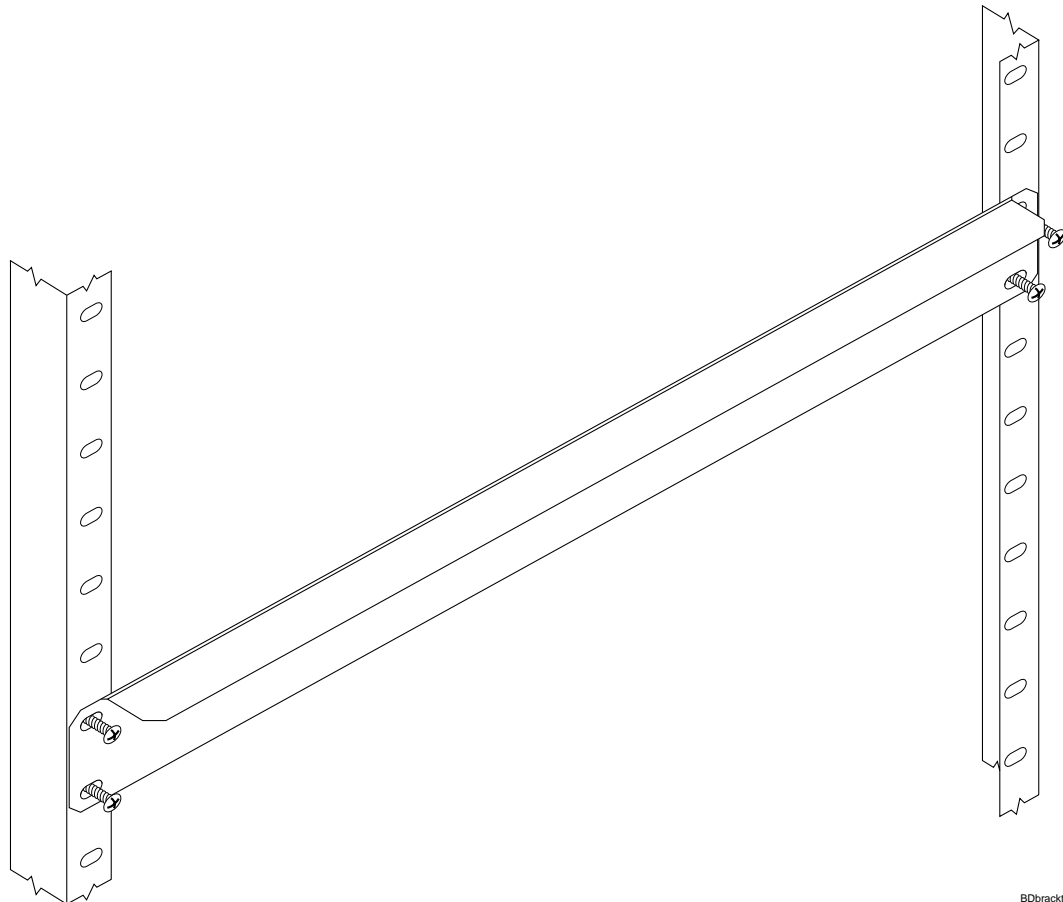


*Note: Mount the chassis in a rack before installing any switch components.*

## Rack Installation

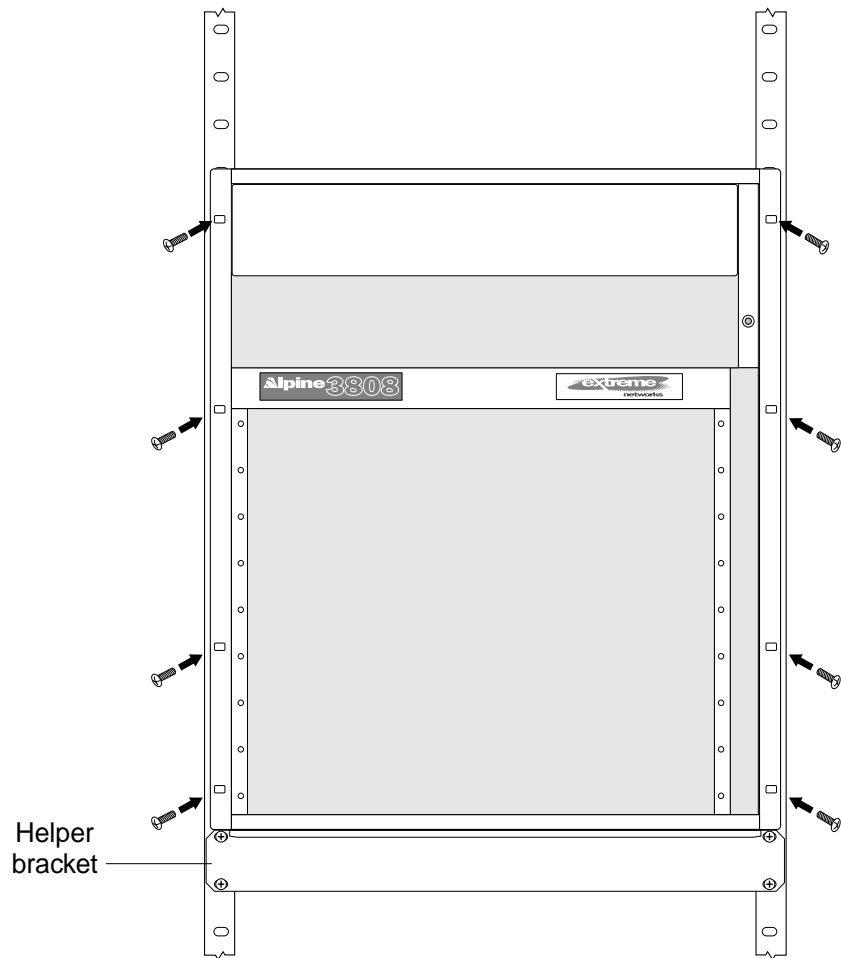
To mount the Alpine 3800 series chassis in a rack:

- 1 Mount the helper bracket in the lowest available position in the rack using four appropriate screws, as shown in Figure 7-7.



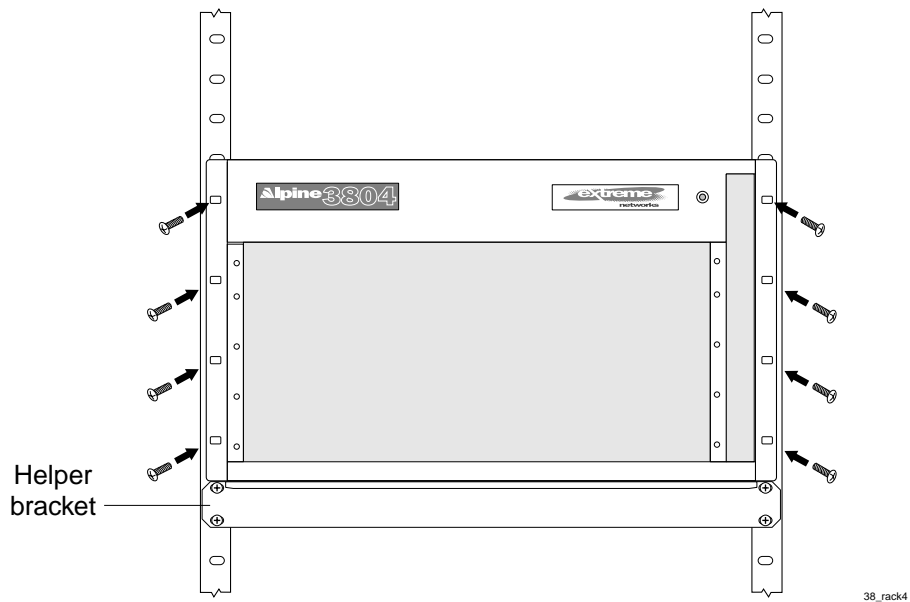
**Figure 7-7:** Helper bracket for mounting the Alpine 3800 series chassis

- 2** Insert the empty chassis into the 19-inch (48.26-cm) rack and place it on the helper bracket.
- 3** Secure the empty chassis with four or eight suitable screws, depending on model, as shown in Figure 7-8, Figure 7-9, and Figure 7-10.
- 4** When the chassis is secured, remove the helper bracket. Store it for future use, for example, if you need to remove the chassis.

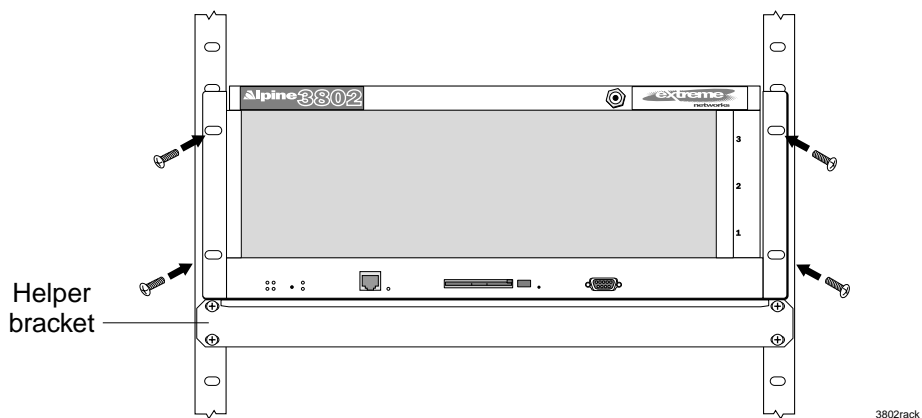


38\_rack8

**Figure 7-8:** The Alpine 3808 chassis requires 8 screws to be securely mounted in a rack



**Figure 7-9:** The Alpine 3804 chassis requires 8 screws to be securely mounted in a rack



**Figure 7-10:** The Alpine 3802 chassis requires 4 screws to be securely mounted in a rack

## Grounding the Alpine 3800 Series Chassis

To ground your Alpine 3800 series chassis in accordance with NEBS standards, gather these materials:

- Two zinc-plated steel lockwashers
- Two zinc-plated steel nuts
- One Panduit-style, standard two-hole barrel, copper compression lug
- Four AWG, high strand-count wire copper cable

To ground the chassis:

- 1 Strip 0.5 inch (1.2 cm) of insulation from the four AWG, high strand-count cable.
- 2 Insert the cable into the cable lug.



*Caution: Ensure that no copper is visible between the lug and the cable insulation.*

- 3 Tighten the cable retention screw, using a  $\frac{1}{4}$ " or  $\frac{5}{16}$ " flathead screwdriver, to 20 in-lbs of torque.
- 4 Attach the ground lug, lock washers, and nuts (in that order) to the grounding studs on the rear of the chassis. Tighten the nuts to 125 in-lbs of torque.

## Removing the Chassis

This section describes how to remove the Alpine 3800 series chassis from the rack.

To remove the Alpine 3800 series chassis from a standard 19-inch (48.26-cm) rack:

- 1 Unplug the power cord from the outlet and then from the switch before you attempt to remove the chassis components and the chassis from the rack.
- 2 Mount the helper bracket in the rack directly beneath the chassis using four screws that are appropriate for your rack.
- 3 To reduce weight and prevent possible equipment damage:
  - Remove the power supply, the SMMi, and the I/O modules from the Alpine 3808 and Alpine 3804.
  - Remove the I/O modules from the Alpine 3802.

For information about removing power supplies, see Chapter 8.

For information about removing the SMMi, see Chapter 9.

For information about removing I/O modules, see Chapter 10.

- 4** Unscrew the chassis from the rack.
- 5** Gently remove the chassis from the rack and place it on a secure, flat surface with the front of the switch facing you.
- 6** Unscrew the helper bracket and remove it from the rack.

8

# Alpine 3800 Series Switch Power Supplies

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This chapter describes:

- Important facts about the Alpine 3800 series power supplies
- Installation and removal procedures for the Alpine 3800 series power supplies

The Alpine 3800 series chassis accommodates two power supplies: AC and DC. If two power supplies are installed in the switch, both installed power supplies must be of the same type. The AC power supplies auto-sense for 110 VAC and 220 VAC power. The DC power supplies require -40 VDC input line voltage. When two power supplies are present, the power is load-shared between the supplies for enhanced longevity.

The power supplies for the Alpine 3808 are inserted into the front of the chassis. The power supplies for the Alpine 3804 are inserted into the lower rear of the chassis. The Alpine 3802 power supply is preinstalled at the factory and is not user-removable. Table 8-1 describes the supported power supplies for the Alpine 3800 series switch.

The Alpine 3800 series switch generates SNMP traps for the following events:

- AC power source fails
- Power supply fails
- Power supply is removed

**Table 8-1:** Supported Power Supplies for the Alpine 3800 Series Switch

Switch Model	AC power supply	DC power supply	Hot-swappable
Alpine 3808	Up to two AC power supplies can be installed.	Up to two DC power supplies can be installed.	Yes
Alpine 3804	Up to two AC power supplies can be installed.	Up to two DC power supplies can be installed.	Yes
Alpine 3802 <sup>1</sup>	Up to two AC power supplies can be installed.	Not currently supported.	No

<sup>1</sup> If you have one power supply installed in the Alpine 3802 switch, it must be installed in the lower power supply tray (PSU A).

## Power Supply LEDs

Table 8-2 and Table 8-3 describe LEDs that pertain to power for the Alpine 3800 series switch.

**Table 8-2:** Alpine 3808 and Alpine 3804 Power Supply LED

LED	Color	Indicates
D/C OK	Green	All DC outputs are operational
	Off	One or more DC outputs have failed

**Table 8-3:** Alpine 3802 Power Supply LEDs

LED	Color	Indicates
PSU A, PSU B	Green	Normal operation
	Amber	DC output failure
	Off	PSU not present or not powered

## Verifying a Successful Installation

After you supply power to the Alpine switch, the SMMi (Alpine 3808 and Alpine 3804) or the integrated Switch Management Module (Alpine 3802) performs a POST. The LED labeled “DIAG” on the SMMi (Alpine 3808 and Alpine 3804) or on the chassis (Alpine 3802) blinks green during the POST. After the SMMi or the integrated management

module has passed its POST and is operational, each I/O module then performs its own POST.



*Note: See Chapter 9 for more information about switch management module LED activity and Chapter 10 for more information about I/O module LED activity.*

## Installing the Alpine 3800 Series AC Power Supply

This section describes how to install an AC power supply for either the Alpine 3808 or the Alpine 3804 switch. The Alpine 3802 switch power supply is preinstalled at the factory. The power supplies for the Alpine 3808 switch are inserted into the front of the chassis. The power supplies for the Alpine 3804 switch are inserted into the lower rear of the chassis.



*Note: Mount the chassis in a rack before installing any switch components.*

To install the Alpine 3808 and Alpine 3804 AC power supplies:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 Remove the blank faceplate that is covering the power supply bay.
- 3 Ensure that the power supply is oriented correctly for either the Alpine 3808 or Alpine 3804 using the text on the front of the power supply, and ensure that the ejector/injector lever is open, as shown in Figure 8-1 and Figure 8-2.



*Caution: When you insert a power supply, use one hand to support the power supply from the bottom and the other hand to hold the central handle on the front of the power supply. Do not use just the ejector/injector lever to insert a power supply.*

- 4 Use the central handle to guide the first power supply into the power supply bay.

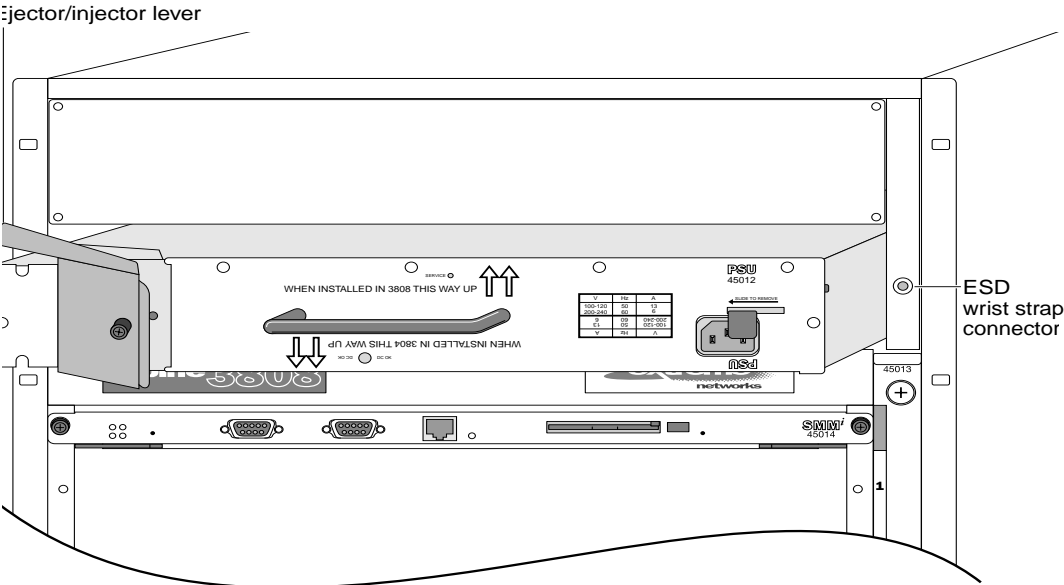


Figure 8-1: AC power supply for the Alpine 3808 switch

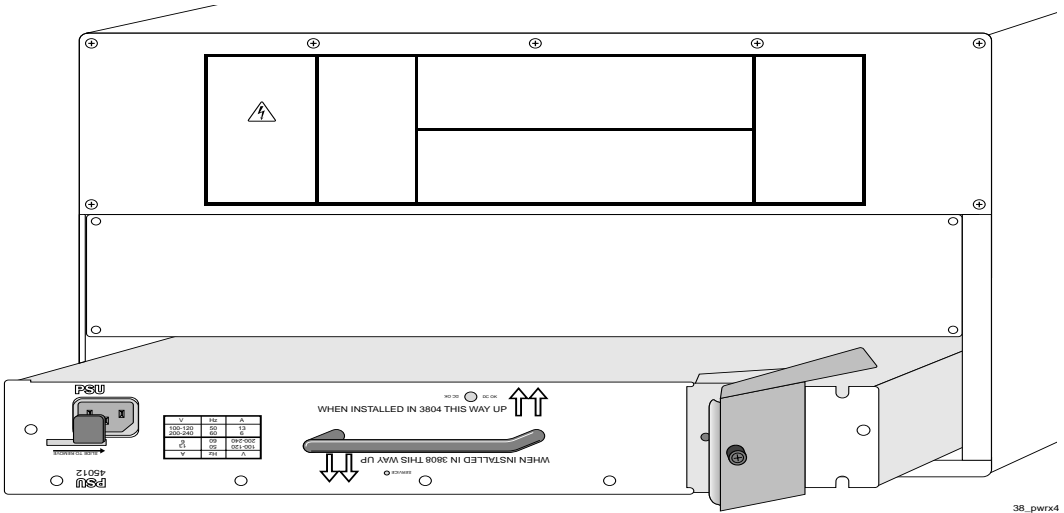


Figure 8-2: AC power supply for the Alpine 3804 switch

- 5 Place both hands on each side of the power supply to slowly and evenly slide the power supply into the bay. During the last inch of insertion into the chassis, place one hand on the central handle to steady the power supply and use your other hand to gently push the ejector/injector lever towards the power supply to engage the power supply backplane connectors.
- 6 Secure the power supply by tightening the screw on the ejector/injector lever with a #2 Phillips screwdriver.
- 7 To uncover the power connector, slide the latch to the right.
- 8 To turn on power to the system, connect the power cord to the power supply and then to the wall outlet.



*Caution: Do not slam the power supply into the backplane. The power supply cannot be installed if an AC power cord is plugged in. You can damage the chassis and power supply if you attempt to install a power supply with an AC power cord connected.*

- 9 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.

To install an additional power supply, repeat step 2 through step 8.

## Removing the Alpine 3800 Series AC Power Supply

To remove an AC power supply from the Alpine 3808 or Alpine 3804 switch:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 Remove the AC power cord from the wall outlet and then from the power supply.
- 3 To cover the power connector, slide the latch to the left.
- 4 Use a #2 Phillips screwdriver to unscrew the screw on the ejector/injector lever then pull the ejector/injector lever towards you to disengage the power supply connectors from the backplane. Hold on to the central handle to steady the power supply.



*Caution: When you remove a power supply, use one hand to support the power supply from the bottom and the other hand to hold the central handle on the front of the power supply. Do not use just the ejector/injector lever to remove a power supply.*

- 5 Use one hand on the central handle to slowly pull the power supply towards you. Place your other hand beneath the power supply to support it as you pull it out of the chassis.
- 6 If you are going to install a replacement power supply, follow the installation steps on page 8-3.



*Caution: Ensure the latch covers the AC power connector. The power supply cannot be removed or installed unless the connector is covered.*

- 7 If there is a problem with the power supply that you removed, contact Extreme Networks for assistance. Do not attempt to fix a faulty power supply. Personal injury to yourself or others may occur.



*Caution: Do not slam the power supply into the backplane. This will cause damage and possibly require the return of the chassis.*

- 8 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.

## Servicing an Alpine 3802 AC Power Supply

The Alpine 3802 switch supports up to two AC power supplies which are preinstalled at the factory.

In the event of a power supply failure, please contact Extreme Networks about servicing and replacing your power supply.



*Note: Alpine 3802 power supplies must be removed and replaced by personnel that have been trained by Extreme Networks.*

If you have only one power supply installed in the Alpine 3802 switch, cover the AC outlet that is not being used with a plastic socket cover. The plastic socket covers come shipped with the switch.

# Installing the Alpine 3800 Series DC Power Supply

This section describes the steps to successfully install your DC power supply:

- Selecting the cabling for your DC power supply
- Installing the DC power supply into the switch
- Attaching the cabling to the DC power supply

## Selecting the Cabling

Use the following guidelines when selecting cabling for the DC power supplies:

- Each DC power supply requires 30 A at -40 VDC (or equivalent power between -40 and -70 VDC).
- For DC power and ground cables, use 8 AWG, high-strand-count wire cable (Alpine 3808) or 10 AWG, high-strand-count wire cable (Alpine 3804).

## Installing the Power Supply

This section describes how to install a DC power supply for either the Alpine 3808 or Alpine 3804. The Alpine 3802 switch does not support DC power supplies.



*Note: Mount the chassis in a rack before installing any switch components.*

To install the Alpine 3808 or Alpine 3804 DC power supplies:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 Remove the blank faceplate that is covering the power supply bay.
- 3 Ensure that the power supply is oriented correctly for either the Alpine 3808 or Alpine 3804 using the text on the front of the power supply, and ensure that the ejector/injector lever is open, the safety latch is in the remove position, and the breaker is in the off position, as shown in Figure 8-3 and Figure 8-4.

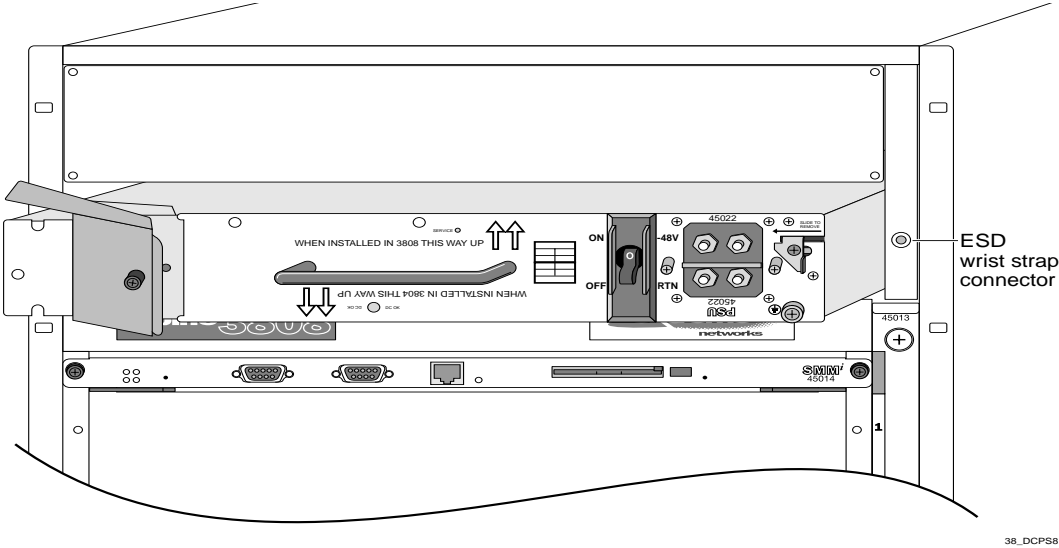


Figure 8-3: DC power supply for the Alpine 3808 switch

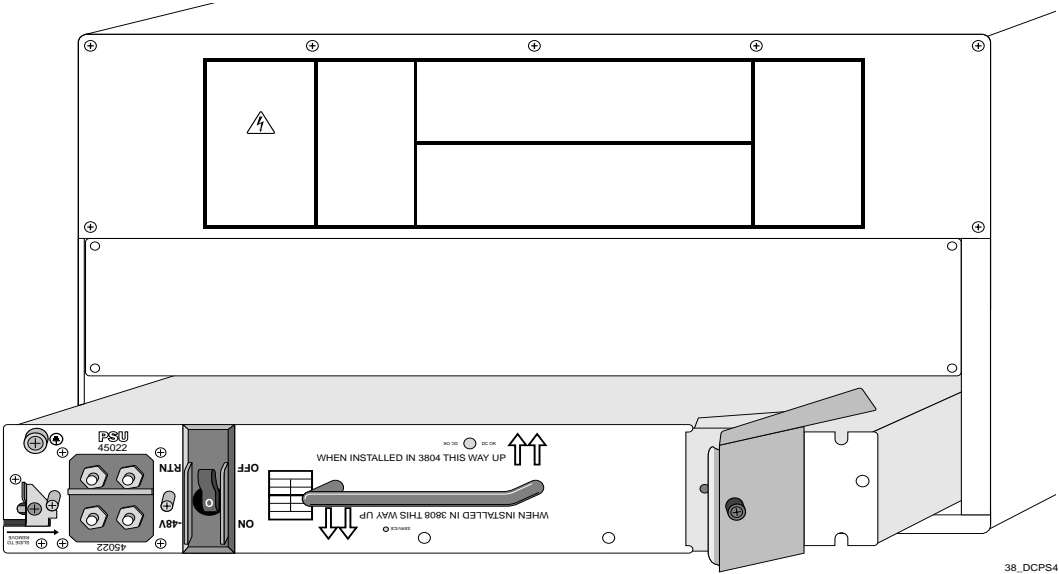


Figure 8-4: DC power supply for the Alpine 3804 switch



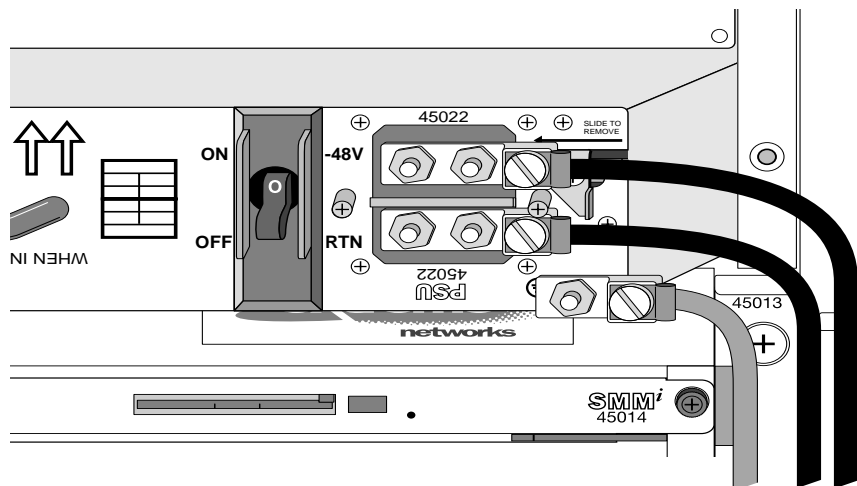
*Caution: When you insert a power supply, use one hand to support the power supply from the bottom and the other hand to hold the central handle on the front of the power supply. Do not use just the ejector/injector lever to insert a power supply.*

- 4** Use the central handle to guide the power supply into the bay while supporting the supply from the bottom with your other hand.
- 5** Place both hands on each side of the power supply to slowly and evenly slide the power supply into the bay. During the last inch of insertion into the chassis, place one hand on the central handle to steady the power supply and use your other hand to gently push the ejector/injector lever towards the power supply to engage the power supply backplane connectors.



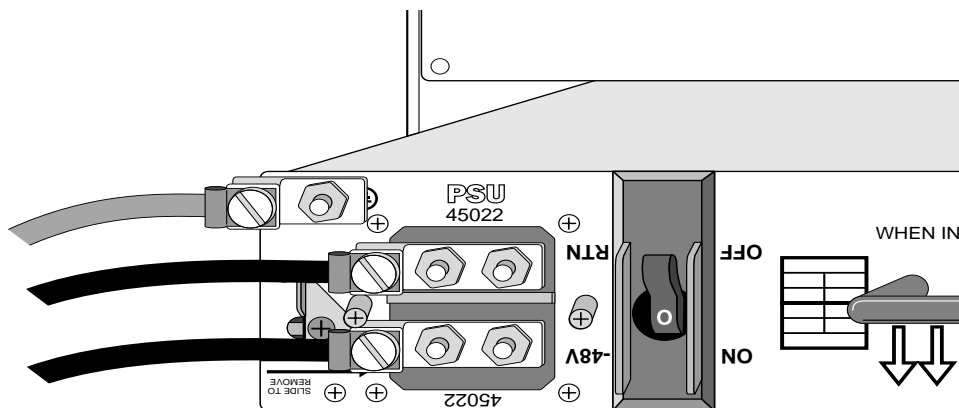
*Caution: Do not slam the power supply into the backplane. This or other excessive force will cause damage and possibly require the return of the chassis.*

- 6** Secure the power supply by tightening the screw on the ejector/injector lever using a #2 Phillips screwdriver.
- 7** Slide the locking latch away from the remove position.
- 8** Remove the plexiglas cover that shields the power connection on the power supply.
- 9** Attach the DC power and ground cables to the power supply, as shown in Figure 8-5 and Figure 8-6.



38\_jugs8

**Figure 8-5:** Alpine 3808 DC power supply with cables attached



38\_jugs4

**Figure 8-6:** Alpine 3804 DC power supply with cables attached

**10** Replace the plexiglas cover.

**11** Turn on the DC supply at both the wall breaker and at the power supply breaker.

- 12 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.

## Attaching the Cabling

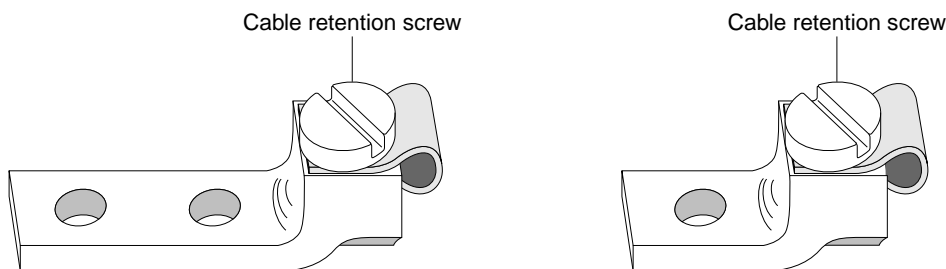
To attach the cable to the lugs, perform the following steps.

- 1 Strip 0.5 inches of insulation from the appropriate AWG, high strand-count cable.
- 2 Insert the cable into the cable lugs.



*Caution: Ensure that no copper is visible between the lug and the cable insulation.*

- 3 Tighten the cable retention screw, using a  $\frac{1}{4}$ " or  $\frac{5}{16}$ " flathead screwdriver, to 20 in-lbs of torque. The cable retention screw is shown in Figure 8-7.



**Figure 8-7:** 2-stud -40 V and RTN lug, and 1-stud ground lug

## Removing the Alpine 3800 Series DC Power Supply

To remove a DC power supply from the Alpine 3808 or Alpine 3804 switch:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 Turn off the DC supply at both the source breaker and at the power supply breaker.
- 3 Remove the plexiglas cover that shields the power connection on the power supply.
- 4 Remove the DC power and ground cables from the power supply.
- 5 Slide the locking latch on the power supply in the direction marked “remove.”



*Caution: Ensure that the latch is in the remove position. You cannot remove the power supply unless the latch is in the remove position.*

- 6** Use a #2 Phillips screwdriver to unscrew the screw on the ejector/injector lever then pull the ejector/injector lever towards you to disengage the power supply connections from the backplane. Hold on to the central handle to steady the power supply.



*Caution: When you remove a power supply, use one hand to support the power supply from the bottom and the other hand to hold the central handle on the front of the power supply. Do not use just the ejector/injector lever to remove a power supply.*

- 7** Use one hand on the central handle to slowly pull the power supply towards you. Place your other hand beneath the power supply to support it as you pull it out of the chassis.
- 8** If you are going to install a replacement power supply, follow the installation steps on page 8-7.
- 9** If there is a problem with the power supply that you removed, contact Extreme Networks for assistance. Do not attempt to fix a faulty power supply. Personal injury to yourself or others may occur.
- 10** Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.

# 9

## Alpine 3800 Series Switch Management Module

This chapter describes:

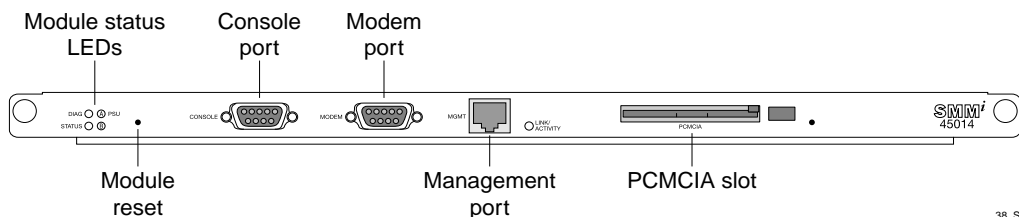
- Important information about the Alpine 3800 series Switch Management Module (SMMi)
- Installation and removal procedures for the Alpine 3800 series SMMi

The Switch Management Module (SMMi) is responsible for upper-layer protocol processing and switch management functions in the Alpine 3808 and Alpine 3804 chassis. The SMMi can store two ExtremeWare software images (version 6.0 or later) and two switch configurations.



*Note: The Alpine 3802 does not require a separate Switch Management Module. All upper-layer protocol processing and switch management functions are part of the integrated Switch Management Module that is located in the chassis.*

Figure 9-1 shows the SMMi.



**Figure 9-1:** Switch Management Module (SMMi)

The SMMi has the following out-of-band management ports:

- Console port—Used to connect a terminal and perform local management.
- Management port—Used to connect an Ethernet cable directly from your laptop into the management port to view and locally manage the switch configurations.
- Modem port —Used to connect a modem for remote access to the CLI.
- PCMCIA slot—Reserved for future use.

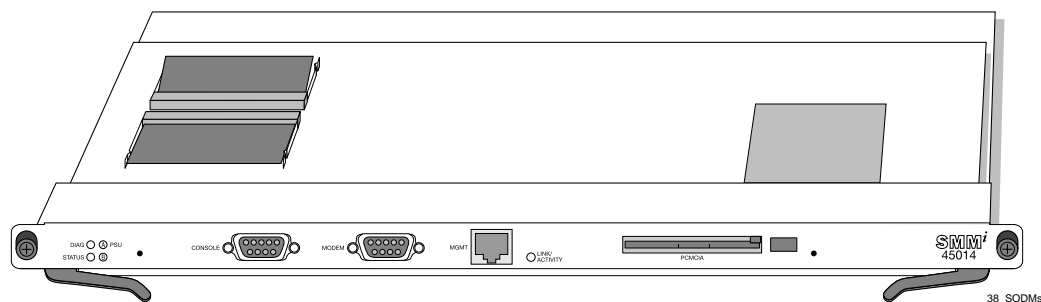
See Chapter 1 for more information about management ports.

## SMMi Memory

The SMMi has two 144-pin SODIMM sockets, and ships with two 128 MB SODRAM modules installed, as shown in Figure 9-2.



*Note: The SMMi supports only the SODIMMs that are supplied by Extreme Networks.*



**Figure 9-2:** SMMi SODIMM sockets



*See “Adding SODIMMs to the SMMi Module” on page 9-4 for more details.*

## SMMi LEDs

Table 9-1 describes the LED activity on the SMMi.

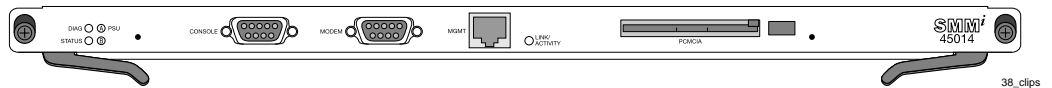
**Table 9-1:** SMMi LEDs

LED	Color	Indicates
DIAG	Green blinking	Power-on Self Test (POST) is running
	Off	Normal operation
STATUS	Green blinking	Normal operation
	Yellow blinking	Critical error, fan failure or over temperature
	Off	Unit powered down
PSU A	Green	PSU is OK
PSU B	Amber	DC output failure
	Off	PSU not present or not powered

## Installing SMMi Modules

To install the SMMi:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 Ensure that the SMMi is oriented correctly (printed circuit board (PCB) on top) and that the ejector/injector handles are open, as shown in Figure 9-3.



**Figure 9-3:** SMMi with open ejector/injector handles

- 3 Slide the SMMi into the appropriate slot of the chassis, until it is fully seated in the backplane.



**Caution:** You can install the SMMi only in the top slot of the Alpine 3808 or 3804 chassis. The SMMi does not fit in any other chassis slots. Forceful insertion can damage the module.



*Note: Use the metal panel, not the PCB, to guide the SMMi.*

As the SMMi begins to seat in the chassis, the ejector/injector handles begin to close.

- 4 Use one hand to hold the module in place and use the other hand to close the ejector/injector handles by pushing them toward the center of the module.
- 5 Tighten the module screws using a #2 Phillips screwdriver.



*Note: Tighten the screws of this module before you insert additional modules. Otherwise, you might unseat modules that you have not secured.*

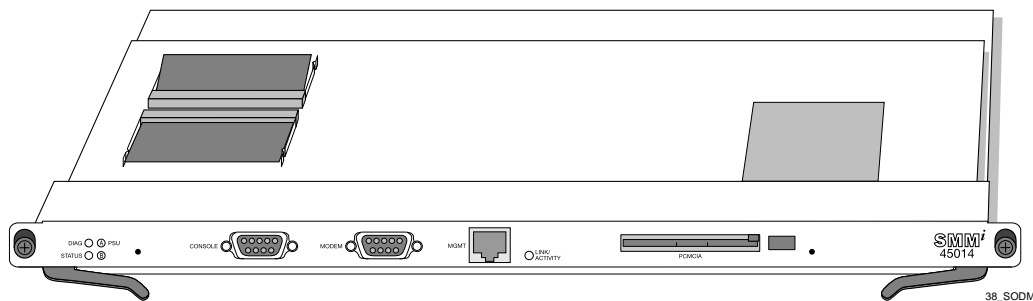
- 6 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.

## Adding SODIMMs to the SMMi Module

The SMMi supports only SODIMMs from Extreme Networks.

To add a SODIMM to the SMMi:

- 1 Attach an ESD strap to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 Locate the SODIMM sockets on the SMMi.
- 3 Position the SODIMM in the socket by ensuring that the gold fingers of the SODIMM slip into the connector and the keying notches align.
- 4 Secure the SODIMM by pressing down firmly until it is locked into the socket and the ejector locks rotate into position, as shown in Figure 9-4.



**Figure 9-4:** Adding a SODIMM

## Removing SODIMMs from the SMMi Module

To remove a SODIMM:

- 1 Attach an ESD strap to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 Disengage the SODIMM by pulling out on the ejector locks located on either side of the SODIMM.
- 3 Rotate the SODIMM out of the socket.

## Removing SMMi Modules

All Alpine 3800 series modules (SMMi and I/O modules) are hot-swappable. You do not need to power off the system to remove or insert a module.

To remove an SMMi module:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 To loosen the module, unscrew the screws using a #2 Phillips screwdriver.
- 3 Simultaneously rotate the ejector/injector handles outward to disengage the module from the backplane.
- 4 Slide the module out of the chassis.
- 5 If you are not going to install a replacement SMMi, cover the slot with a blank faceplate. Otherwise, follow the SMMi module installation procedure on page 9-3.
- 6 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.





# Alpine 3800 Series I/O Modules

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This chapter describes:

- Configuration information and specifications for the Alpine 3800 series I/O modules
- Installation and removal procedures for the Alpine 3800 series I/O modules

## Configuring I/O Modules

No configuration information is stored on the I/O modules; configuration information is stored on the SMMi for the Alpine 3808 and 3804 chassis and the integrated Switch Management Module in the Alpine 3802 chassis.



*Note: There is a slight difference in appearance between Alpine Ethernet I/O modules and Alpine Access I/O modules. Alpine Ethernet I/O modules have a green stripe along the side of the module. Alpine Access I/O modules have a silver stripe along the side of the module.*

When the Alpine 3800 series switch is powered on, ExtremeWare generates a default configuration for any slots with I/O modules. The default configuration allows the I/O module ports to participate in the VLAN named *default*. The default configuration for the I/O module is not preserved unless you explicitly save the information to nonvolatile RAM (NVRAM).

You can configure parameters of the I/O module after it is installed or you can pre-configure a slot for a certain type of module and configuration. The pre-configured information is applied to the module after it is inserted. If you pre-configure a slot for a

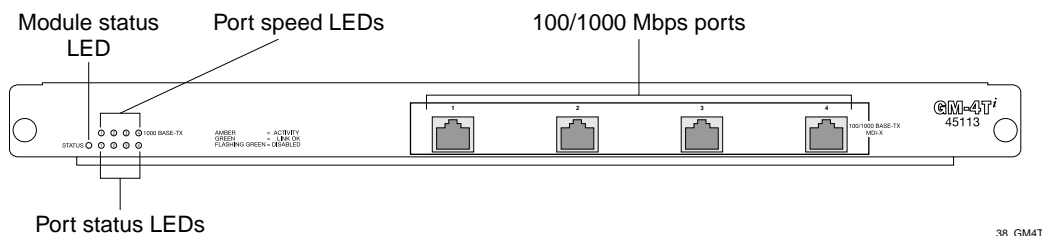
specific module type, and then insert a different type of module, the module reverts to its default configuration.



*Note: See the ExtremeWare Software User Guide for more information about configuring I/O modules.*

## GM-4Ti Module

Figure 10-1 shows the GM-4Ti module.



**Figure 10-1:** GM-4Ti module

The GM-4Ti module has four Gigabit Ethernet ports. All Gigabit Ethernet ports on this module use standard RJ-45 connectors and autonegotiate for 100BASE-TX or 1000BASE-T.

The default configuration of the GM-4Ti module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in autonegotiation mode.



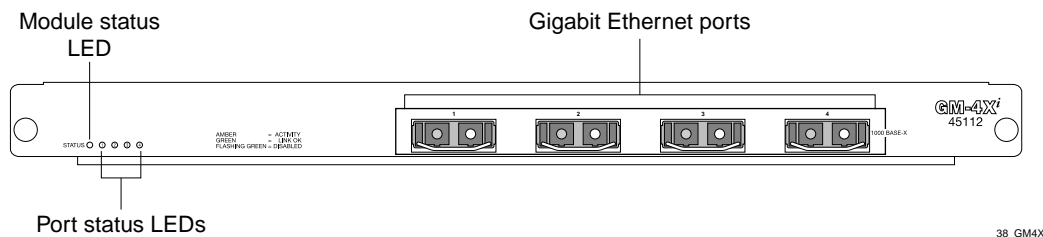
*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*



*Note: See “I/O Module LEDs,” on page 10-18 for information on LED activity.*

## GM-4Xi Module

Figure 10-2 shows the GM-4Xi module.



**Figure 10-2:** GM-4Xi module

The GM-4Xi module has four GBIC-based Gigabit Ethernet ports. All Gigabit Ethernet ports on this module use standard GBIC connectors and support 1000BASE-SX, 1000BASE-LX, and 1000BASE-LX70.

The default configuration of the GM-4Xi module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in autonegotiation mode.



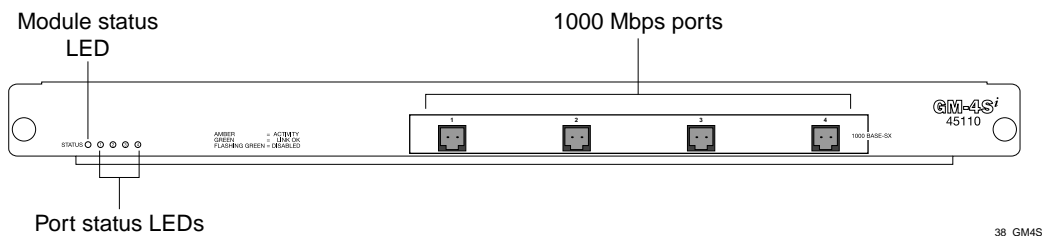
*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*



*Note: See “I/O Module LEDs,” on page 10-18 for information on LED activity.*

## GM-4Si Module

Figure 10-3 shows the GM-4Si module.



**Figure 10-3:** GM-4Si module

The GM-4Si module has four Gigabit Ethernet ports using standard MT-RJ connectors. The GM-4Si module supports 1000BASE-SX only.

The default configuration of the GM-4Si module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in autonegotiation mode.



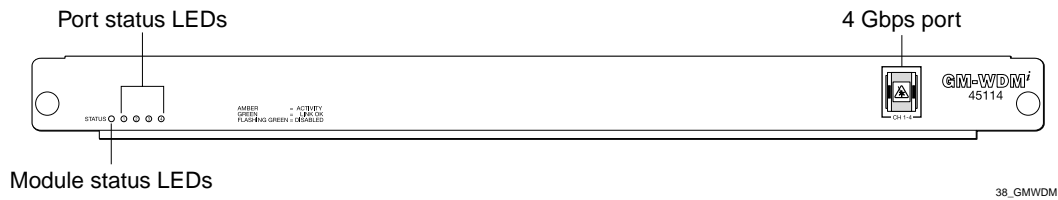
*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*



*Note: See “I/O Module LEDs,” on page 10-18 for information on LED activity.*

## GM-WDMi Module

Figure 10-4 shows the GM-WDMi module.



**Figure 10-4:** GM-WDMi module

The GM-WDMi module has one 4 Gbps port, which supports four full-duplex Gigabit Ethernet channels. The port transmits over a single mode fiber cable using wavelength division multiplexing. The port uses an SC-APC simplex connector with a spring-loaded safety cover. APC connectors are polished at an 8° angle to minimize loss and reflections over extended transmit distances.

The default configuration of the GM-WDMi module is as follows:

- The port is added to the default VLAN as untagged.
- The port inherits the properties of the default VLAN (protocol type, VLANid, and so forth).

The GM-WDMi module transmits bi-directionally on the fiber cable and then multiplexes these wavelengths over the single-mode optical fiber.

The total optical system budget for the GM-WDMi module is 12 dB. Measure cable plant losses with a 1550 nm light source to verify that your cable plant losses are within the optical budget. Table 10-1 describes the optical specifications for the GM-WDMi module.

**Table 10-1:** GM-WDMi Optical Interface Specifications

Parameter	Minimum	Typical	Maximum
<b>Transmitter</b>			
Optical output power	-5 dBm	-3 dBm	1 dBm
Channel 1 wavelength	1495 nm	1501 nm	1507 nm
Channel 2 wavelength	1515 nm	1521 nm	1527 nm
Channel 3 wavelength	1535 nm	1541 nm	1547 nm

**Table 10-1:** GM-WDMi Optical Interface Specifications (continued)

Parameter	Minimum	Typical	Maximum
Channel 4 wavelength	1555 nm	1561 nm	1567 nm
<b>Receiver</b>			
Optical input power sensitivity	-17 dBm		
Optical input power maximum			-1 dBm
<b>Fiber Optic Cable</b>			
Back reflection			-25 dB

Extreme Networks recommends that you reserve 3 dB for losses due to cable splices, connectors, and operating margin. Table 10-2 describes the cable attenuation, cable budget, and operating distance for a variety of cable attenuation ratings for the GM-WDMi module.

**Table 10-2:** GM-WDMi Maximum Transmit Distances

Cable Attenuation	Cable Budget	Maximum Distance
0.20 dB/km	9 dB	45 km
0.25 dB/km	9 dB	36 km
0.30 dB/km	9 dB	30 km

A minimum of 2 dB attenuation is required to prevent saturation of the receiver.

## Software Requirements

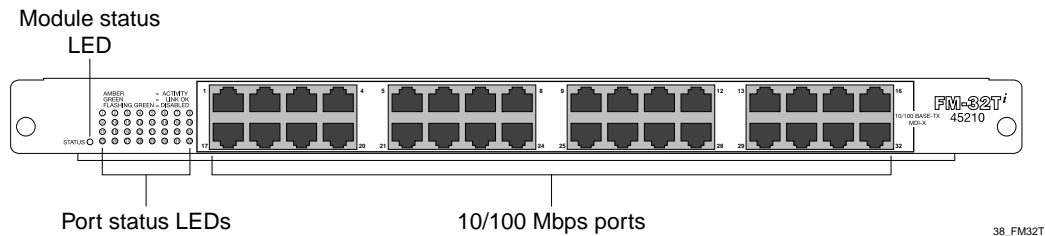
The GM-WDMi module requires that you load ExtremeWare version 6.1.8 or later and BootROM 6.5 or later on your switch.



*Note: See “I/O Module LEDs,” on page 10-18 for information on LED activity.*

## FM-32Ti Module

Figure 10-5 shows the FM-32Ti module.



**Figure 10-5:** FM-32Ti module

The FM-32Ti module has 32 0/100 Mbps autonegotiating Ethernet ports, using standard RJ-45 connectors. The FM-32Ti module supports autonegotitation of 10BASE-T and 100BASE-TX.

The default configuration of the FM-32Ti module is as follows:

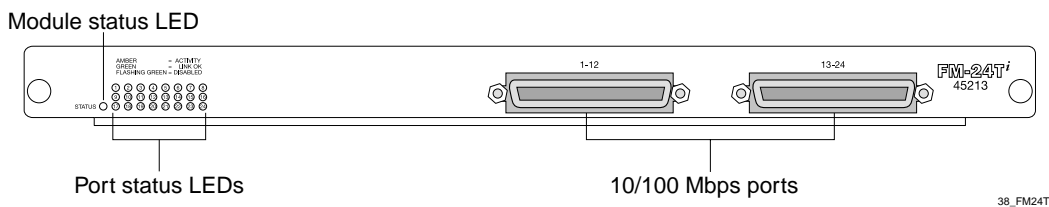
- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so on).
- All ports operate in autonegotiation mode.



*Note:* See “I/O Module LEDs,” on page 10-18 for information on LED activity.

## FM-24Ti Module

Figure 10-6 shows the FM-24Ti module.



**Figure 10-6:** FM-24Ti module

The FM-24Ti module has 24 10/100 Mbps autonegotiation Ethernet ports, using standard RJ-21 connectors. The FM-24Ti module supports 10BASE-T and 100BASE-TX.

The default configuration of the FM-24Ti module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in autonegotiation mode.

### Software Requirements

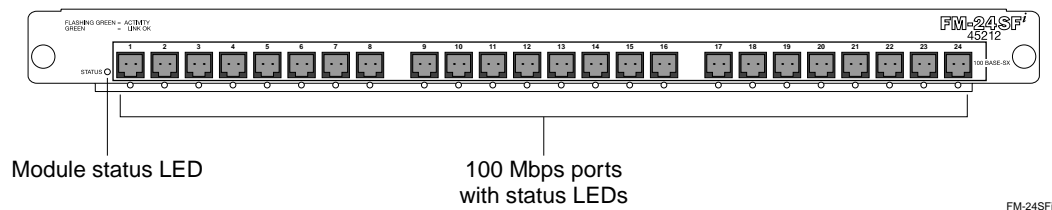
The FM-24Ti module requires that you load ExtremeWare software version 6.1.7 or later and BootROM 6.5 or later on your switch.



*Note: See “I/O Module LEDs,” on page 10-18 for information on LED activity.*

## FM-24SFi Module

Figure 10-7 shows the FM-24SFi module.



**Figure 10-7:** FM-24SFi module

The FM-24SFi module has 24 100 Mbps Ethernet ports, using standard MT-RJ connectors. The FM-24SFi module supports 100BASE-FX in single mode only.

The default configuration of the FM-24SFi module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in 100 Mbps, single mode. Half-duplex mode is not supported.

### Software Requirements

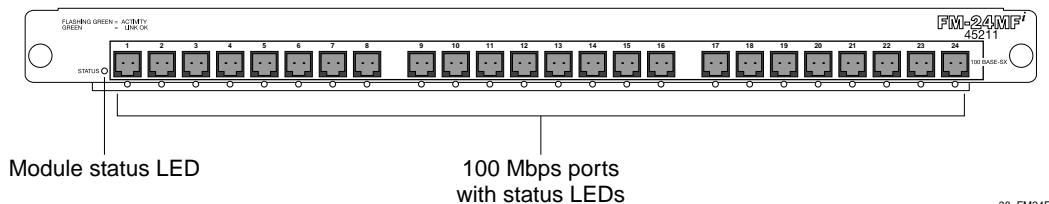
The FM-24SFi module requires that you load ExtremeWare version 6.1.7 or later and BootROM 6.5 or later on your switch.



*Note: See “I/O Module LEDs,” on page 10-18 for information on LED activity.*

## FM-24MFi Module

Figure 10-8 shows the FM-24MFi module.



38\_FM24F

**Figure 10-8:** FM-24MFi module

The FM-24MFi module has 24 100 Mbps Ethernet ports, using standard MT-RJ connectors. The FM-24MFi module supports 100BASE-FX in multi-mode only.

The default configuration of the FM-24MFi module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in 100 Mbps, multi-mode. Half-duplex mode is not supported.

### Software Requirements

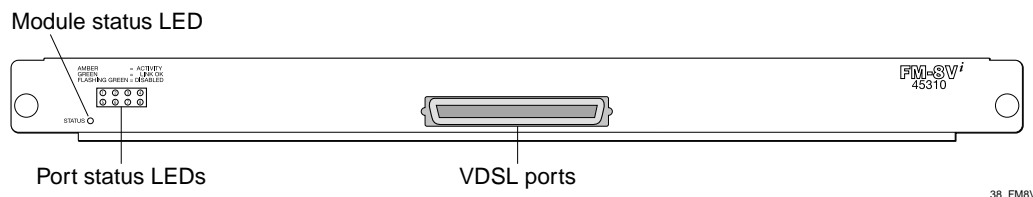
The SMMi requires ExtremeWare software version 6.1.5 or later to operate the FM-24MFi.



*Note: See “I/O Module LEDs,” on page 10-18 for information on LED activity.*

## FM-8Vi Module

Figure 10-9 shows the FM-8Vi module.



**Figure 10-9:** FM-8Vi module

The FM-8Vi module has eight 10 Mbps VDSL ports, using one standard RJ-21 connector, and eight internal loopback ports for ingress rate-shaping. The FM-8Vi module supports 10BASE-S.

The default configuration of the FM-8Vi module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in autonegotiation mode.

### Connecting the FM-8Vi Module to the Mogul-100

The FM-8Vi uses a single RJ-21 connector for the eight VDSL ports on the module. The cable connector on the FM-8Vi has a Velcro™ strap to secure the connector on the cable to the module.

To deliver this VDSL connection to a subscriber, the bundle of twisted pairs that are contained in the RJ-21 cable must be separated for connection to individual Mogul-100 customer premises equipment. Typically, you connect the cable from the FM-8Vi to a punch-down block and wire the individual VDSL circuits into RJ-11 jacks for connection to the Mogul-100s. Use the two center conductors of the RJ-11 connector to connect the wire pairs.

Your particular installation depends on the physical cabling in your building.

The connector on the FM-8Vi requires a male terminated RJ-21 cable. The FM-8Vi uses eight of the twenty-five pairs in the cable. Because the RJ-21 standard was established

for telecommunications, one wire of each pair is designated as the tip side and the other wire is designated as the ring side.

Table 10-3 lists the pin numbers on the connector, the color code for the wires, and the associated port number for the wire pair.

**Table 10-3: RJ-21 Connector and Wire Pairs**

<b>VDSL Port</b>	<b>Ring Side Pin Number/Wire Color</b>	<b>Tip Side Pin number/Wire Color</b>
1	1 blue white	26 white blue
2	2 orange white	27 white orange
3	3 green white	28 white green
4	4 brown white	29 white brown
5	5 slate white	30 white slate
6	6 blue red	31 red blue
7	7 orange red	32 red orange
8	8 green red	33 red green

## Software Requirements

The FM-8Vi module requires that the SMMi has ExtremeWare software version 6.1.5 or later and BootROM 6.5 or later. For more information about software requirements and module configuration, see the *ExtremeWare Release Notes Software Version 6.1.5w2.01 Rev1*. The FM-8Vi module also requires a connection to the Mogul-100. For more information about Mogul-100 configuration, see the *Mogul-100 Quick Guide*.

**Configuring the FM-8Vi.** The VDSL connection from the FM-8Vi to the Mogul-100 is automatically established by the hardware on the two devices. There are no commands to configure this VDSL connection.

However, the VDSL ports on the FM-8Vi connect to the Mogul-100 in such a way that the Ethernet port on the Mogul-100 behaves as though it is located on the Alpine switch. When you configure a port on the FM-8Vi, you are configuring the Ethernet port on the Mogul-100. For example, when you add port 2 on the FM-8Vi to a VLAN, the Ethernet port on the Mogul-100 connected to port 2 of the FM-8Vi now belongs to that VLAN.

The ports on the Mogul-100 that are controlled by the FM-8Vi accept configurations using the same commands and procedures as the ports on the FM-32Ti and FM-24Fi modules, except that the ports can only be configured for 10 Mbps.

The slot configuration command now includes a keyword to specify the FM-8Vi. To configure the slot for the FM-8Vi, use the following command:

```
config slot <slot> module fm8v
```

The following example configures slot 2 for the FM-8Vi module:

```
config slot 2 module fm8v
```

**Displaying VDSL Statistics.** For the FM-8Vi module, the show port command has been enhanced to show VDSL statistics. To display VDSL statistics, use the following command:

```
show port <portlist> vdsl stats
```

The following command displays the VDSL statistics for ports 2:1 through 2:4:

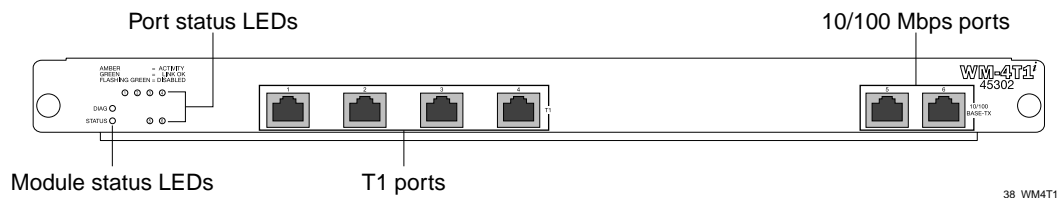
```
show port 2:1-2:4 vdsl stats
```



*Note: See “I/O Module LEDs,” on page 10-18 for information on LED activity.*

## WM-4T1i Module

Figure 10-10 shows the WM-4T1i module.



**Figure 10-10:** WM-4T1i module

The WM-4T1i module has four T1 ports, using RJ-48 connectors, and two 10/100 Mbps autonegotiating Ethernet ports, using standard RJ-45 connectors. The WM-4T1i also has eight internal loopback ports that allow you to configure bi-directional rate-limiting without tying up any of the external ports for ingress rate shaping. Internal loopback ports are marked with the notation “iL” when displayed on the command line or with ExtremeWare Vista Web access. The WM-4T1i module supports T1 and autonegotiation of 10BASE-T and 100BASE-T.

The default configuration of the WM-4Ti module is as follows:

- The four T1 ports allow 1.54 Mbps, and the other two ports in autonegotiation mode allow 10 Mbps or 100 Mbps, and full duplex or half-duplex operation.

### Software Requirements

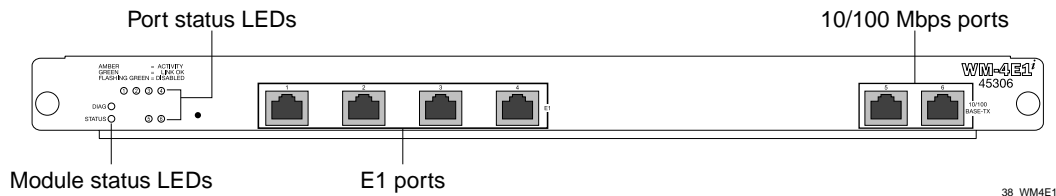
The WM-4T1i module requires that you load ExtremeWare software version 6.1.5 or later and BootROM 6.5 or later on your switch. For more information about software requirements and module configuration, see the *WM-4T1i Module Installation and User Guide*.



*Note:* See “Access I/O Module LEDs,” on page 10-18 for information on LED activity.

## WM-4E1i Module

Figure 10-11 shows the WM-4E1i module.



**Figure 10-11:** WM-4E1i module

The WM-4E1i module has four E1 ports, using RJ-48 connectors, and two 10/100 Mbps autonegotiating Ethernet ports, using standard RJ-45 connectors. The WM-4E1i also has eight internal loopback ports that allow you to configure bi-directional rate-limiting without tying up any of the external ports for ingress rate shaping. Internal loopback ports are marked with the notation “iL” when displayed on the command line or with ExtremeWare Vista Web access. The WM-4E1i module supports E1 and autonegotiation of 10BASE-T and 100BASE-T.

The default configuration of the WM-4Ei module is as follows:

- The four E1 ports allow 1.54 Mbps, and the other two ports in autonegotiation mode allow 10 Mbps or 100 Mbps, and full duplex or half-duplex operation.

## Software Requirements

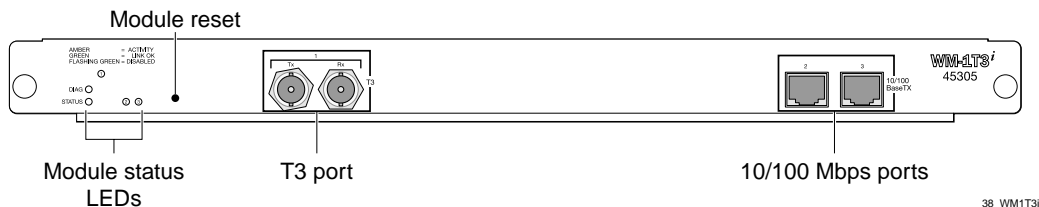
The WM-4E1i module requires ExtremeWare software version 6.1.5 or later and BootROM 6.5 or later. For more information about software requirements and module configuration, see the *WAN Module Installation and User Guide*.



*Note:* See “Access I/O Module LEDs,” on page 10-18 for information on LED activity.

## WM-1T3i Module

Figure 10-12 shows the WM-1T3i module.



**Figure 10-12:** WM-1T3i module

The WM-1T3i module has one T3 port, consisting of a two BNC connectors, one for the transmit path and one for the receive path. The module also has two general purpose 10/100 Ethernet ports, using standard RJ-45 connectors. The WM-1T3i also has eight internal loopback ports that allow you to configure bi-directional rate-limiting without tying up any of the external ports for ingress rate shaping. Internal loopback ports are marked with the notation "iL" when displayed on the command line or with ExtremeWare Vista Web access.



**Note:** See "Access I/O Module LEDs," on page 10-18 for information on LED activity.

## Software Requirements

The WM-1T3i module requires ExtremeWare software version 6.1.5 or later and BootROM 6.5 or later. For more information about software requirements and module configuration, see the *WAN Module Installation and User Guide*.

## I/O Module LEDs

This section describes the Alpine I/O module LEDs.

Table 10-4 describes the LED activity on the I/O modules.

**Table 10-4:** Alpine I/O Module LEDs

LED	Color	Indicates
Status	Green	Normal operation
	Amber	Disabled
Port (all except FM-24MFi and FM-24SFi)	Green	Link up
	Flashing green	Disabled
	Amber	Packet activity
Port (FM-24MFi and FM-24SFi only)	Off	Link down
	Green	Link up
	Flashing green	Packet activity
	Off	Link down

## Access I/O Module LEDs

This section describes the Alpine Access I/O module LEDs.

Table 10-5 describes the LED activity on the WM-4T1i, WM-4E1i, and WM-1T3i Access I/O modules.

**Table 10-5:** Access I/O Module LEDs

LED	Color	Indicates
Status	Off	No power
	Amber	Module seated in chassis
	Green	Module powered up
Diag	Green blinking	Power-on Self Test (POST) is running
	Off	Normal operation

**Table 10-5:** Access I/O Module LEDs (continued)

LED	Color	Indicates
WAN port (1-4)T1/E1 (1)T3	Amber	Near-end fault has been detected (for example, no cable)
	Amber rapidly blinking	Far-end fault has been detected
	Amber slowly blinking	Physical link is present, but no higher-layer link (port is misconfigured or disabled)
	Green	Physical link is present, higher-layer link is established, but no traffic is present
	Alternating green and amber	Physical link is present, higher-layer link is established, and traffic is present
	Green rapidly blinking	Loopback testing mode is in progress
	Green slowly blinking	Port is active, but disabled
10/100 port (5,6)T1/E1 (2,3)T3	Off	No link is present
	Green	Link is present
	Alternating green and amber	Traffic is present

The slowly blinking LEDs cycle once per second. The rapidly blinking LEDs cycle twice a second.

## Installing I/O Modules

You can insert I/O modules at any time, without causing disruption of network services.

To install an I/O module:

### 1 Select a slot for the module:

- Slots are numbered 1 through 8 in the Alpine 3808 chassis
- Slots are numbered 1 through 4 in the Alpine 3804 chassis
- Slots are numbered 1 through 3 in the Alpine 3802 chassis



*Caution: Do not install I/O modules into the top unnumbered slot of the Alpine 3808 or Alpine 3804 chassis; this slot is designated for SMMi modules only. I/O modules do not fit in the top slot of the Alpine 3808 or Alpine 3804 chassis. Forceful insertion can damage the I/O module.*

- 2 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 3 Remove the blank faceplate from the slot, if applicable.
- 4 Ensure that the module is oriented correctly (PCB on top), and the ejector/injector levers are open.
- 5 Slide the module into the appropriate slot of the chassis until it makes contact with the backplane.

As the module begins to seat in the chassis, the ejector/injector levers begin to close.

- 6 Use one hand to hold the module in place and your other hand to close the ejector/injector handles by pushing them toward the center of the module.
- 7 To secure the module, tighten the two captive screws using a #2 Phillips screwdriver.



*Note: Tighten the screws before you insert additional modules. Otherwise, you might unseat modules that you have not secured.*

- 8 Store the module packaging for future use.
- 9 Repeat this procedure for additional modules, if applicable.
- 10 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.

## Removing I/O Modules

You can remove I/O modules at any time, without causing disruption of network services.

All Alpine 3800 series modules (SMMi and I/O modules) are hot-swappable. You do not need to power off the system to remove or insert a module.

To remove an I/O module:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 Use a #2 Phillips screwdriver to unscrew the two captive screws.
- 3 Simultaneously rotate the ejector/injector handles away from the center of the module to disengage the module from the backplane.
- 4 Slide the module out of the chassis.

- 5 If you are not going to install a replacement I/O module, cover the slot with a blank faceplate. Otherwise, follow the I/O module installation procedure on page 10-19.
- 6 Repeat this procedure for additional modules, if applicable.
- 7 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.





# Alpine 3800 Series Switch Fan Tray

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This chapter describes:

- Important facts about the fan trays for the Alpine 3808, Alpine 3804, and Alpine 3802 switches
- Installation and removal procedures for the Alpine 3808 and Alpine 3804 switch fan trays

## Alpine 3808 Fan Tray

The Alpine 3808 fan tray (no. 45013):

- Contains five individual fans
- Is accessed from the front of the chassis
- Is hot-swappable which means you can remove and replace the fan tray without powering down the switch
- Can be removed and installed by customers



*Caution: Do not cover or obstruct the fan ventilation holes at the rear of the unit. Doing so can result in overheating and possible damage to the Alpine 3808 switch. Thermal sensors will shut down the Alpine 3808 switch if the internal temperature exceeds 60 degrees Celsius.*

ExtremeWare monitors the fan trays in the Alpine 3808 switch for failure and overheat conditions. All fan failures and over temperature events cause the switch to send alerts

to the network management station or to the switch log. See the *ExtremeWare Software User Guide* for more information about switch monitoring.

## Alpine 3804 Fan Tray

The Alpine 3804 fan tray (no. 45015):

- Contains three individual fans
- Is accessed from the front of the chassis
- Is hot-swappable which means you can remove and replace the fan tray without powering down the switch
- Can be removed and installed by customers



*Caution: Do not cover or obstruct the fan ventilation holes at the rear of the unit. Doing so can result in overheating and possible damage to the Alpine 3804 switch. Thermal sensors will shut down the Alpine 3804 switch if the internal temperature exceeds 60 degrees Celsius.*

ExtremeWare monitors the fan trays in the Alpine 3804 switch for failure and overheat conditions. All fan failures and over temperature events cause the switch to send alerts to the network management station or to the switch log. See the *ExtremeWare Software User Guide* for more information about switch monitoring.

## Alpine 3802 Fan Tray

The Alpine 3802 fan tray:

- Contains two individual fans
- Is preinstalled at the factory
- Is not hot-swappable which means you must power down the switch before you can remove and replace the fan tray
- Cannot be removed and installed by customers
- Must be removed and replaced by personnel trained by Extreme Networks



*Caution: Do not cover or obstruct the fan ventilation holes at the rear of the unit. Doing so can result in overheating and possible damage to the Alpine 3802 switch. Thermal sensors will shut down the Alpine 3802 switch if the internal temperature exceeds 60 degrees Celsius.*



*Note: In the event of a fan tray failure, please contact Extreme Networks.*

ExtremeWare monitors the fan trays in the Alpine 3802 switch for overheat conditions. All over temperature events cause the switch to send alerts to the network management station or to the switch log. See the *ExtremeWare Software User Guide* for more information about switch monitoring.

## Removing an Alpine 3808 or Alpine 3804 Fan Tray

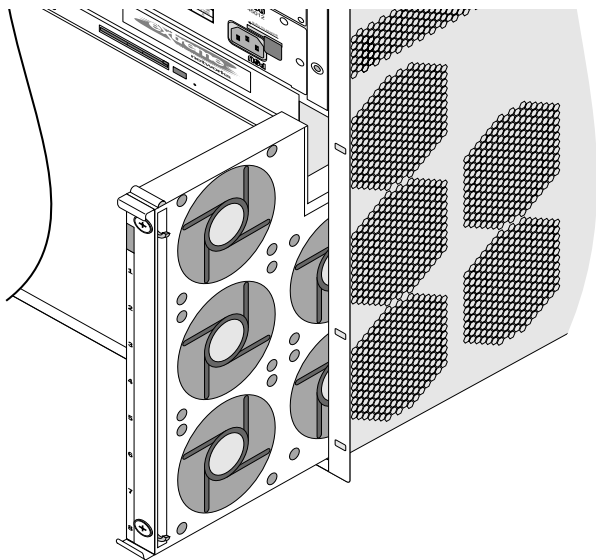
To remove a fan tray from the Alpine 3808 or Alpine 3804 switch:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 Unscrew the two captive screws that secure the fan tray to the chassis by turning them counterclockwise (to the left).
- 3 Use the finger grips to pull the fan tray out of the chassis approximately 1-inch (2.54-cm), as shown in Figure 11-1 and Figure 11-2; this step disconnects the power and causes the fans to stop rotating.
- 4 Allow the fan blades to stop spinning before you remove the fan tray from its slot.



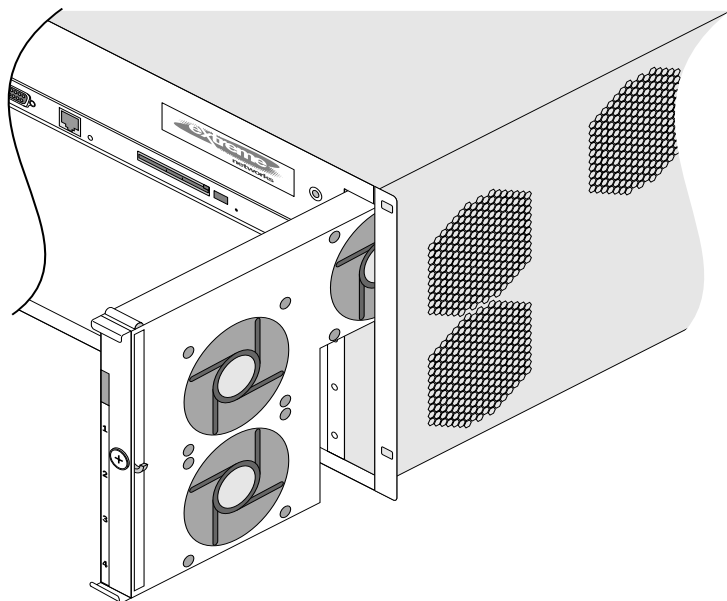
*Warning: Keep your hands away from rotating fan blades.*

- 5 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.



38\_fantr8

**Figure 11-1:** Alpine 3808 fan tray



38\_fantr4

**Figure 11-2:** Alpine 3804 fan tray

## Installing an Alpine 3808 or Alpine 3804 Fan Tray

To install a fan tray in the Alpine 3808 or Alpine 3804 switch:

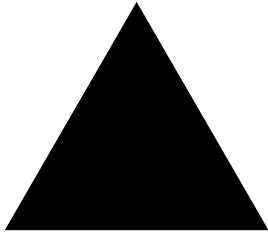
- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-right corner of the switch front panel.
- 2 Gently begin to insert the new fan tray into the bay.



*Note: If the chassis is powered on, the fan blades will begin turning as soon as the tray makes contact with the backplane.*

- 3 To secure the fan tray, turn the screws clockwise until they become tight.
- 4 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.





Part 5:

BlackDiamond Switch

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# BlackDiamond 6800 Series Switch Overview

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The BlackDiamond 6800 series switches are chassis-based switches designed to be placed in the core of your network. The BlackDiamond 6800 series switches are flexible and scalable, making it easy for you to meet the changing requirements of your network. Two models exist:

- BlackDiamond 6816 provides 16 slots for I/O modules
- BlackDiamond 6808 provides 8 slots for I/O modules

The combination of BlackDiamond, Alpine, and Summit switches delivers a consistent end-to-end network solution that provides a nonblocking architecture, wire-speed switching, wire-speed IP routing, and policy-based Quality of Service (QoS).

This chapter describes:

- The features available on the BlackDiamond 6800 series switch
- The components of the BlackDiamond 6800 series switch
- The importance of following safety information
- The architecture and design of the BlackDiamond 6800 series switch

## Summary of Features

The features of the BlackDiamond 6800 series switches include:

- The BlackDiamond 6816 20-slot chassis, which can be populated with up to 16 input/output (I/O) modules and 4 Management Switch Fabric Modules (MSM64i modules)
- The BlackDiamond 6808 10-slot chassis, which can be populated with up to eight I/O modules and 2 MSM64i modules
- I/O modules and MSM64i modules are hot-swappable, and include Gigabit Ethernet or 10/100 Mbps Ethernet ports
- Redundant, load-sharing, hot-swappable power supplies
- Field-replaceable, hot-swappable fan tray
- Autonegotiation for half- or full-duplex operation on 10/100 Mbps ports
- Load-sharing on multiple ports
- VLANs, including support for IEEE 802.1Q
- STP (IEEE 802.1D) with multiple STP domains
- Policy-based QoS
- Wire-speed IP routing
- IP multinetting
- DHCP/BOOTP relay
- RIP version 1 and RIP version 2
- OSPF routing protocol
- IPX routing, including RIP and SAP
- Wire-speed IP multicast routing
- IGMP and IGMP snooping
- DVMRP
- IGMP snooping to control IP multicast traffic
- Console (RS-232) CLI connection
- Telnet CLI connection
- ExtremeWare Vista Web-based management interface
- SNMP support

## Port Connections

The BlackDiamond 6800 series switches support the following port configurations that are available on the different BlackDiamond I/O modules as described in Table 12-1.



*Caution: Modules that use SX, LX, and LX70 interfaces contain Class 1 laser devices. The P3cSi, P3cMi, P12cSi, P12cMi, A3cSi, and WDMi modules also use Class 1 laser devices. These ports can emit invisible laser radiation. Avoid direct eye exposure to beam.*

**Table 12-1:** Port Configurations Available on BlackDiamond I/O Modules

Module	Ethernet Ports					
	10BASE-T/ 100BASE-TX	100BASE-T/ 1000BASE-T	GBIC	1000BASE-SX	100BASE-FX	OTHER
G8Ti		8				
G4X			4			
G6X			6			
G8Xi			8			
G12SXi				12		
WDMi						1 10-Gbps
F32T	32					
F48T	48					
F96Ti	96					
F32Fi					32	
P3cSi						4 OC-3
P3cMi						4 OC-3
P12cSi						2 OC-12
P12cMi						2 OC-12
ARM						N/A
MPLS						N/A
A3cSi						4 OC-3

# Switch Components

There BlackDiamond 6816 chassis and the BlackDiamond 6808 chassis use the same I/O modules, management modules, and power supplies, but they use different power trays. The BlackDiamond 6816 chassis only supports modules and power supplies with an “i” in their name, such as the MSM64i.

## BlackDiamond 6816 Switch

The BlackDiamond 6816 switch consists of the following components:

- One 20-slot chassis with backplane
- 16 I/O module slots, labeled slots 1 through 16
- Four MSM64i slots, labeled slots A through D
- Four power supply bays (accessed from the front of the unit)
- Two fan trays (accessed from the front of the unit)
- Two side mounted handles for lifting the chassis
- One electromagnetic discharge (ESD) wrist strap connector



*Note: The BlackDiamond 6816 chassis only supports modules and power supplies with an “i” in their name, such as the MSM64i.*

## BlackDiamond 6808 Switch

The BlackDiamond 6808 switch consists of the following components:

- One 10-slot chassis with backplane
- Eight I/O module slots, labeled slots 1 through 8
- Two MSM64i slots, labeled slots A and B
- Two power supply bays (accessed from the front of the unit)
- One fan tray (accessed from the rear of the unit)
- One electromagnetic discharge (ESD) wrist strap connector

## BlackDiamond Power Supplies

Three types of power supplies are available for the BlackDiamond switches:

- 220 VAC
- 110 VAC
- -48 VDC

All installed power supplies must be of the same type. You cannot mix 110 VAC, 220 VAC, and -48 VDC power supplies in a single chassis.

All BlackDiamond power supplies are hot-swappable. They are also load-sharing. If one power supply fails in a BlackDiamond 6800 series chassis, the remaining power supplies will provide sufficient power to operate a chassis that has all slots populated with modules.

## Switch Connectivity and the Backplane

Switch connectivity is an important aspect of the BlackDiamond 6800 series switch. The MSM64i module is the internal switch fabric for data being sent between I/O modules. No configuration information is stored on the I/O modules; all configuration information is stored on the MSM64i module(s). Each MSM64i has two CPUs for protocol processing and network management. For full redundancy, you can install up to four MSM64i modules in the BlackDiamond 6816 switch and up to two MSM64i modules in the BlackDiamond 6808 switch.

The BlackDiamond 6800 series switch has a 100% passive backplane which means the backplane does not contain any active components that can fail. A passive backplane is important because it increases the reliability of the switch. The I/O modules treat the backplane as one logical connection and use the same load sharing (trunking) algorithm as the front facing ports to distribute the switch traffic. There are multiple Gigabit links from the I/O modules to the MSM64i modules, and most I/O modules have eight full duplex Gigabit Ethernet links to the backplane that provide 16 bps full duplex bandwidth to the backplane. If one of the backplane Gigabit Ethernet links fails, ExtremeWare reroutes the switch traffic from the failed backplane Gigabit Ethernet link to another available backplane link. By moving to another available backplane link, switch connectivity is not disrupted.

With ExtremeWare 6.1 and later, you can configure the backplane load-sharing algorithm. The default load-sharing algorithm uses ingress port-based trunking. In an Internet bridging or routing environment, the address-based algorithm may be more appropriate. For more information about how to configure the backplane load-sharing algorithm, see the *ExtremeWare Software User Guide*.

## Packet Switching and Routing

Each installed I/O module has Gigabit Ethernet links that attach to the backplane. The backplane divides these links equally among the MSM64i modules that are installed in the switch. For example, if you install an F48Ti module, it has eight Gigabit Ethernet links to the switch backplane. If you have a BlackDiamond 6816 and install four MSM64i modules, each module receives two of the eight Gigabit Ethernet links. If you have a BlackDiamond 6808 and install two MSM64i modules, each module receives four of the eight Gigabit Ethernet links.

## Following Safety Information

All service to BlackDiamond 6800 series modules, fan trays, and power supplies should be performed by qualified service personnel only.



*Warning: Read the safety information in Appendix A thoroughly before installing your Extreme Networks switch. Failure to follow this safety information can lead to personal injury or damage to the equipment.*



# BlackDiamond 6800 Series Switch Chassis

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There are two models in the BlackDiamond 6800 series: The BlackDiamond 6816 switch and the BlackDiamond 6808 switch.

This chapter describes:

- The architecture and front and rear views of each BlackDiamond 6800 series chassis
- The supported port configurations for each BlackDiamond 6800 series chassis
- The installation and removal procedures for the BlackDiamond 6800 series chassis

## BlackDiamond 6800 Series Architecture

This section describes and shows the architecture of the BlackDiamond 6800 series chassis. For each chassis, the front view shows an example of a completely installed chassis with optional I/O modules that you can install in the chassis. The rear view shows the back of the chassis.

### BlackDiamond 6816 Switch Front View

The BlackDiamond 6816 switch consists of the following components:

- One 20-slot chassis with backplane
- 16 I/O module slots, labeled slots 1 through 16
- Four MSM64i slots, labeled slots A through D
- Four power supply bays (accessed from the front of the unit)

- Two fan trays (accessed from the front of the unit)
- Two side-mounted handles for lifting the chassis
- One electromagnetic discharge (ESD) wrist strap connector

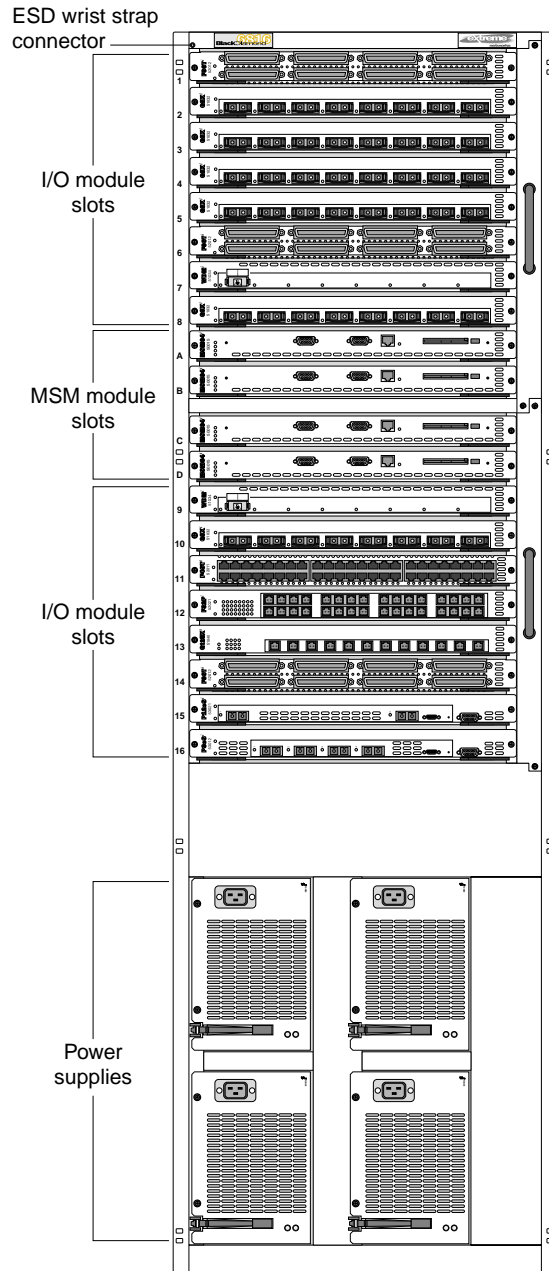
The BlackDiamond 6816 switch can support the following number of ports and types of port configurations:

- Up to 1344 switched 10BASE-T/100BASE-TX Ethernet ports
- Up to 448 switched 100BASE-FX Fast Ethernet ports
- Up to 192 switched Gigabit Ethernet ports

Figure 13-1 shows the front view of the BlackDiamond 6816 chassis installed with 4 MSM64i modules and 16 optional I/O modules.

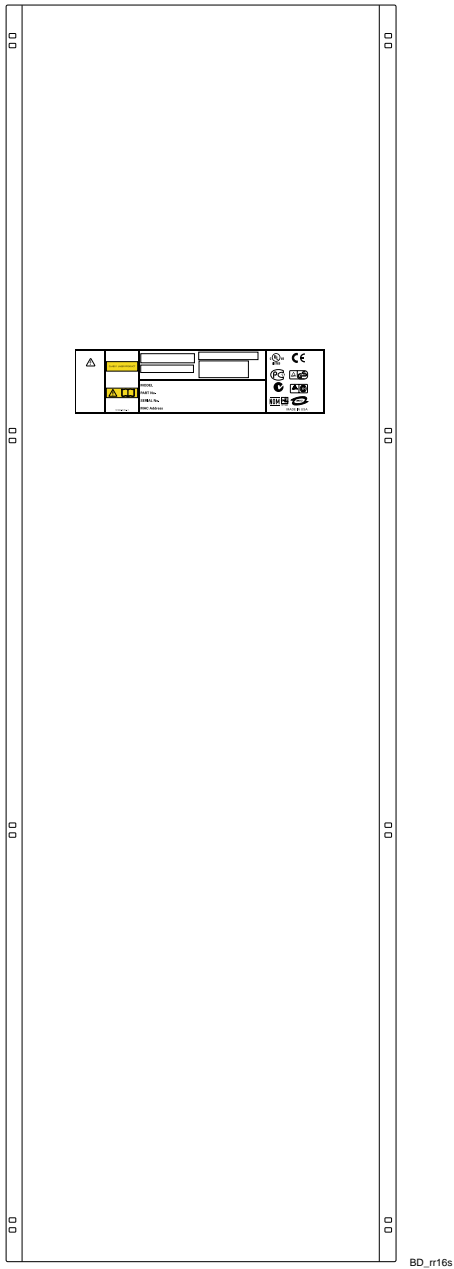


*Note: The BlackDiamond 6816 chassis only supports modules and power supplies with an “i” in their name, such as the MSM64i.*



BD\_6816s

**Figure 13-1:** Front view of the BlackDiamond 6816 switch with sample I/O modules



**Figure 13-2:** Rear view of the BlackDiamond 6816 switch

## BlackDiamond 6816 Switch Rear View

The rear of the BlackDiamond 6816 switch provides:

- The chassis serial number
- The Ethernet MAC address of the switch
- Symbols of safety certification

Figure 13-2 shows the rear view of the BlackDiamond 6816 switch.

## BlackDiamond 6808 Switch Front View

The BlackDiamond 6808 switch consists of the following components:

- One 10-slot chassis with backplane
- Eight I/O module slots, labeled slots 1 through 8
- Two MSM64i slots, labeled slots A and B
- Two power supply bays (accessed from the front of the unit)
- One fan tray (accessed from the rear of the unit)
- One electromagnetic discharge (ESD) wrist strap connector

The BlackDiamond 6808 switch can support the following number of ports and types of port configurations:

- Up to 672 switched 10BASE-T/100BASE-TX Ethernet ports
- Up to 224 switched 100BASE-FX Fast Ethernet ports
- Up to 96 switched Gigabit Ethernet ports

Figure 13-3 shows the front view of the BlackDiamond 6808 chassis installed with two MSM64i modules and ten optional I/O modules.

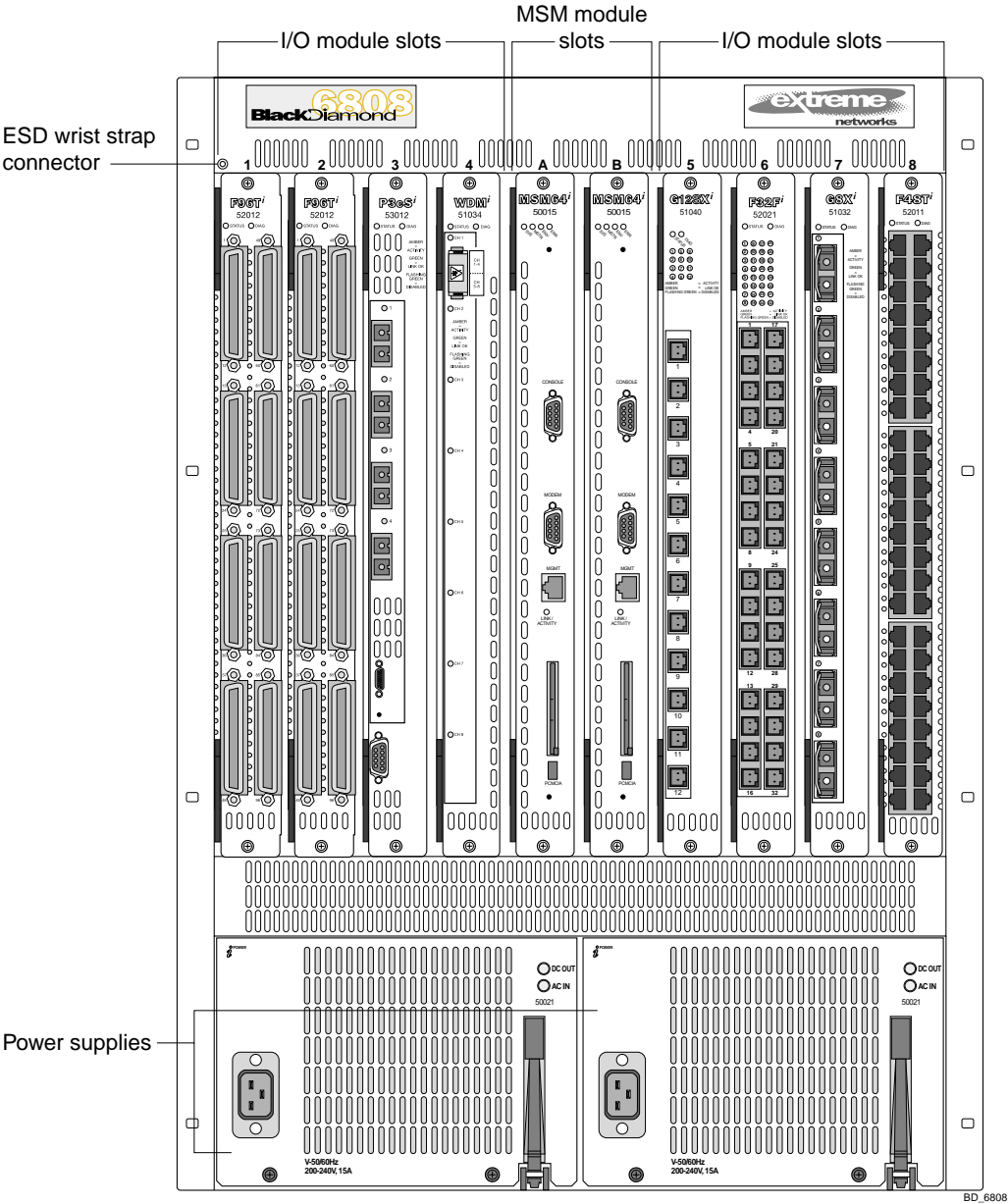


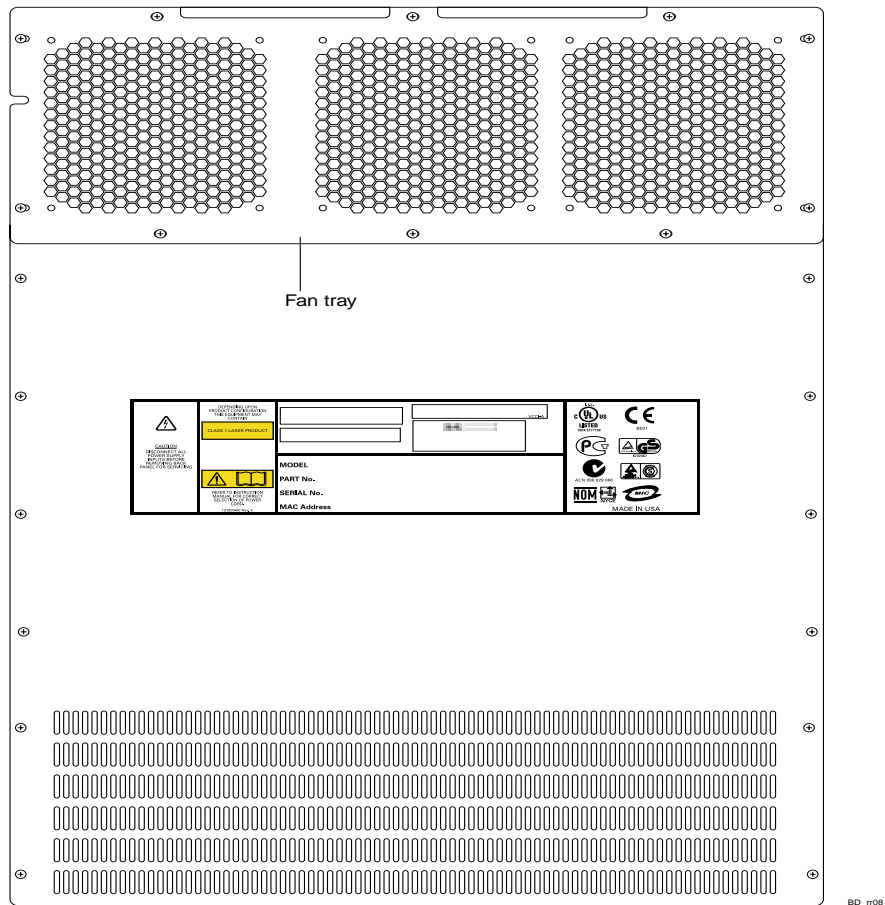
Figure 13-3: Front view of the BlackDiamond 6808 switch with sample I/O modules

## BlackDiamond 6808 Switch Rear View

The rear of the BlackDiamond 6808 switch provides:

- Access to the fan tray
- The chassis serial number
- The Ethernet MAC address of the switch
- Symbols of safety certification

Figure 13-4 shows the rear view of the BlackDiamond 6808 switch.



**Figure 13-4:** Rear view of the BlackDiamond 6808 switch

# Installing the Chassis

The BlackDiamond 6800 series chassis fits in standard 19-inch (48.26-cm) racks. The BlackDiamond chassis measures 35 U in height, and the BlackDiamond 3808 chassis measures 15 U in height.

The BlackDiamond 6800 series chassis is shipped empty. For your safety, due to the increased weight of the chassis after components are installed and to prevent damage to the equipment, we strongly recommend that you install the power supply and modules after you mount the empty chassis in a rack.

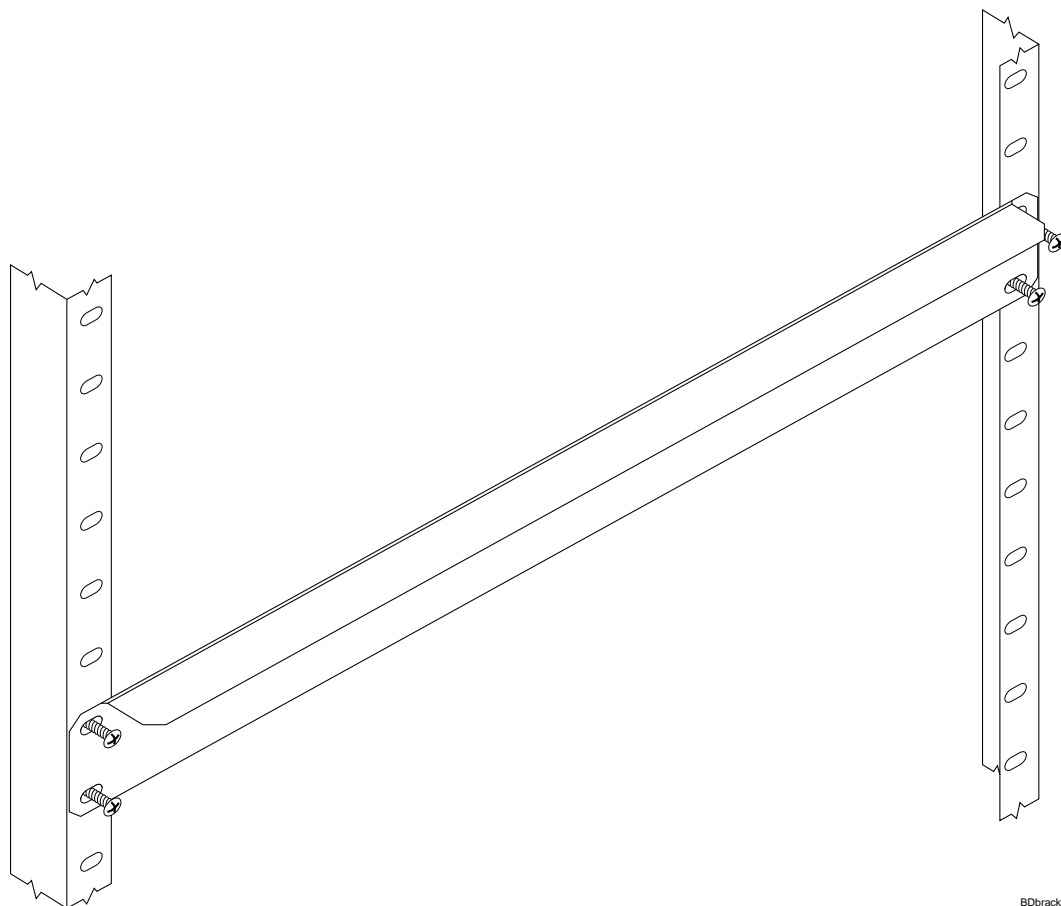


*Note: Mount the chassis in a rack before installing any switch components.*

## Rack Installation

To mount the BlackDiamond 6800 series chassis in a rack:

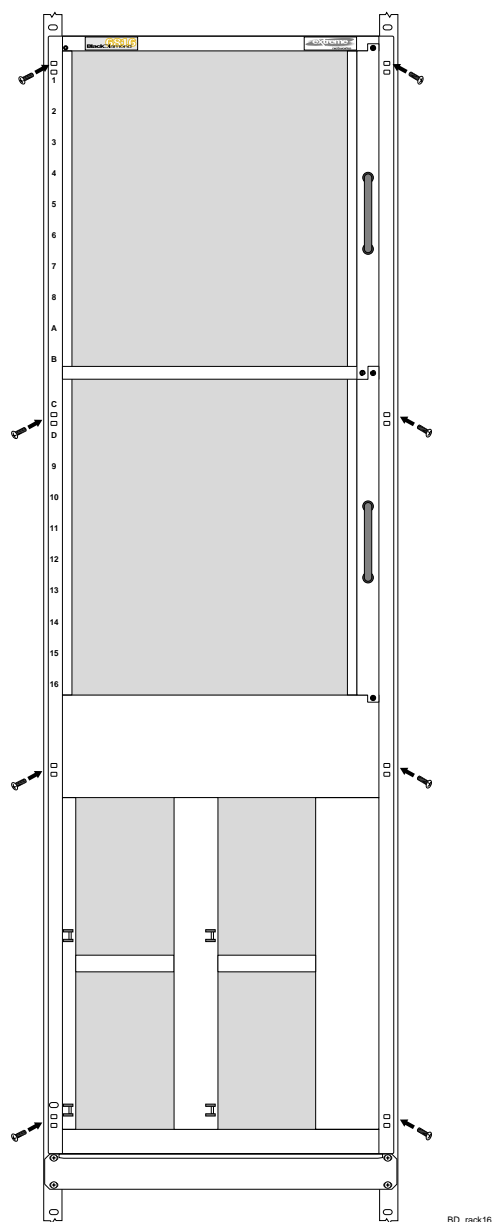
- 1 Mount the helper bracket in the rack using four appropriate screws, as shown in Figure 13-5.



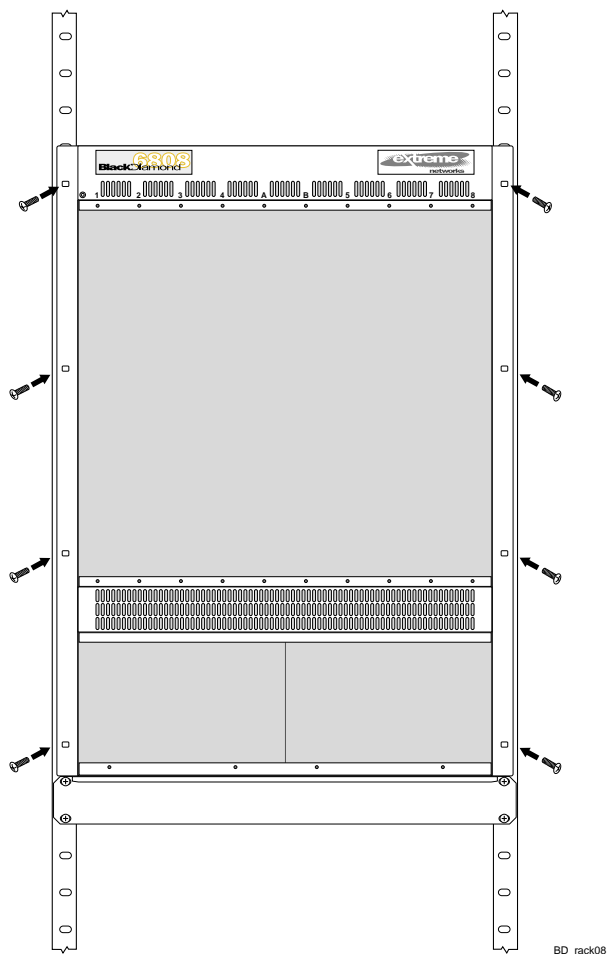
BDbracket

**Figure 13-5:** Helper bracket for mounting a BlackDiamond 6800 series chassis

- 2** Insert the empty chassis into the 19-inch (48.26-cm) rack and place it on the helper bracket.
- 3** Secure the empty chassis with eight suitable screws, as shown in Figure 13-6 and Figure 13-7.
- 4** When the chassis is secured, remove the helper bracket. Store it for future use, for example, if you need to remove the chassis.



**Figure 13-6:** The BlackDiamond 6816 chassis requires 8 screws to be securely mounted in a rack



**Figure 13-7:** The BlackDiamond 6808 chassis requires 8 screws to be securely mounted in a rack

## Removing the Chassis

This section describes how to remove the BlackDiamond 6800 series chassis from the rack.

To uninstall the BlackDiamond 6800 series chassis from a standard 19-inch (48.26-cm) rack:

- 1** Unplug the power cord from the outlet and then from the switch before you attempt to remove the chassis components and the chassis from the rack.
- 2** Mount the helper bracket in the rack directly beneath the chassis using four screws that are appropriate for your rack.
- 3** To reduce weight and prevent possible equipment damage, remove the power supply, the MSM64i module(s), and the I/O modules from the BlackDiamond 6800 series chassis.

For information about removing power supplies, see Chapter 14.

For information about removing the MSM64i, see Chapter 15.

For information about removing I/O modules, see Chapter 16.

- 4** Unscrew the chassis from the rack.
- 5** Gently remove the chassis from the rack and place it on a secure, flat surface with the front of the switch facing you.
- 6** Unscrew the helper bracket and remove it from the rack.



# BlackDiamond 6800 Series Switch Power Supplies

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This chapter describes:

- Important facts about the BlackDiamond 6800 series power supplies
- Installation and removal procedures for the Alpine 3800 series power supplies

BlackDiamond power supplies are iPower power supplies. Three types of power supplies are available:

- 220 VAC
- 110 VAC
- -48 VDC

All installed power supplies must be of the same type. You cannot mix 110 VAC, 220 VAC, and -48 VDC power supplies in a single chassis.

All BlackDiamond power supplies are fully fault-tolerant and hot-swappable. They are also load-sharing. If you have three or more power supplies installed in a BlackDiamond 6818 switch or two or more power supplies installed in a BlackDiamond 6808 switch, you can remove one of them without turning off power to the chassis.



*Note: If you install four power supplies in your BlackDiamond 6816 chassis, the power supplies will deliver full redundancy.*

The BlackDiamond 6800 series switch generates SNMP traps for the following events:

- AC power source fails

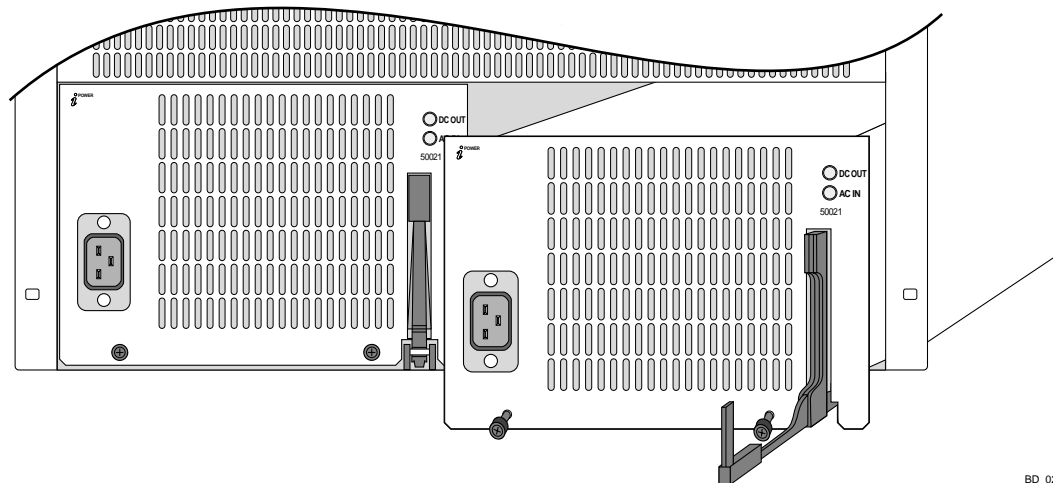
- Power supply fails
- Power supply is removed

## 220 VAC Power Supplies

If you install a 220 VAC power supply into the BlackDiamond 6800 series chassis, 220 Volts of power is required for full operation. If you operate the BlackDiamond 6800 series switch at 110 Volts instead of 220 Volts, it is possible that not all of the I/O modules will power up. The MSM64i will perform power calculations and power up the maximum number of I/O modules from left (slot 1) to right (slot 16 in the BlackDiamond 6816 and slot 8 in the BlackDiamond 6808). It is possible to skip a module if that module is not within the power budget but the subsequent module is. When you use 110 Volts, typically only eight modules in the BlackDiamond 6816 and four modules in the BlackDiamond 6808 are powered on.

The BlackDiamond switch supports a combination of the old 220 VAC PSUs (part number 50012) with the new iPower 220 VAC PSUs (part number 50021) when installed in the same chassis. However, you may get reduced power if a combination of the two types of 220 VAC PSUs are installed in the same chassis.

220 VAC power supplies slide in from the front of the chassis, as illustrated in Figure 14-1.



BD\_028

**Figure 14-1:** 220 VAC power supplies in a BlackDiamond 6808

Table 14-1 describes the LED activity on the 220 VAC power supply.

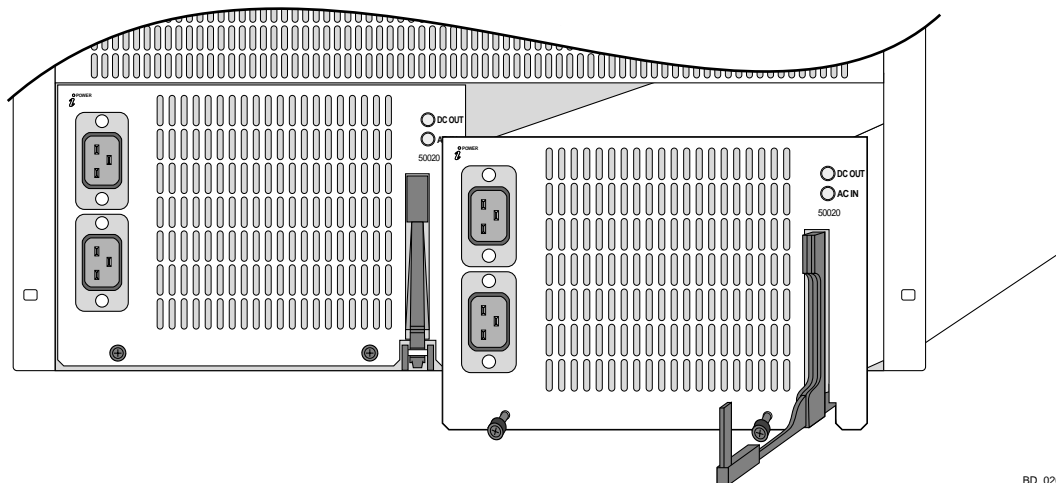
**Table 14-1:** LEDs on the 220 VAC Power Supply

LED	Color	Indicates
AC In	Green	Input voltage is 220 V
	Amber	Input voltage is less than 180 V
	Off	No input power
DC Out	Green	All DC outputs are operational
	Amber	One or more DC outputs have failed
	Off	No power

## 110 VAC Power Supplies

The BlackDiamond 110 VAC power supply has two IEC 320 C19 inputs on the front of the power supply. Both power cords must be connected for the power supply to operate properly, and both power cords require a dedicated 20 A 110 VAC source power connection.

Power supplies slide in from the front of the chassis, as illustrated in Figure 14-2.



**Figure 14-2:** 110 VAC power supplies in a BlackDiamond 6808

BD\_026

Table 14-2 describes the LED activity on the 110 VAC power supply.

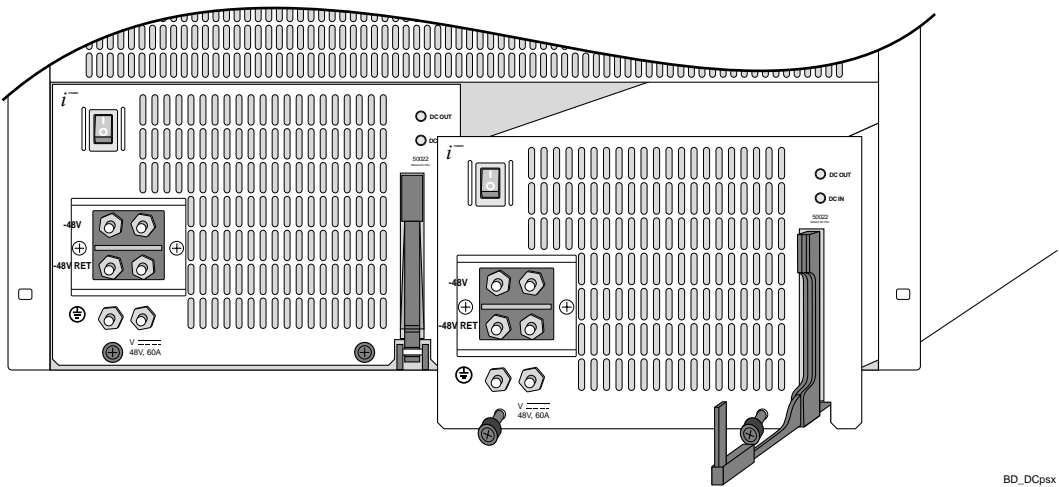
**Table 14-2:** 110 VAC Power Supply LED Activity

LED	Color	Indicates
AC In	Green	Powered using both inputs
	Amber	Powered using only one input, or input voltage is less than 100 V
	Off	No input power
DC Out	Green	All DC outputs are operational
	Amber	One or more DC outputs failed
	Off	No power

## DC Power Supplies

The BlackDiamond DC power supplies operate with DC input that can range from -42 to -72 V. Each DC power supply requires a dedicated 60 A service.

The DC inputs are located on the front of the power supply. The input terminals are isolated from the ground terminal. Power supplies slide in from the front of the chassis, as illustrated in Figure 14-3.



**Figure 14-3:** DC power supplies in a BlackDiamond 6808

Table 14-3 describes the LED activity on the DC power supply.

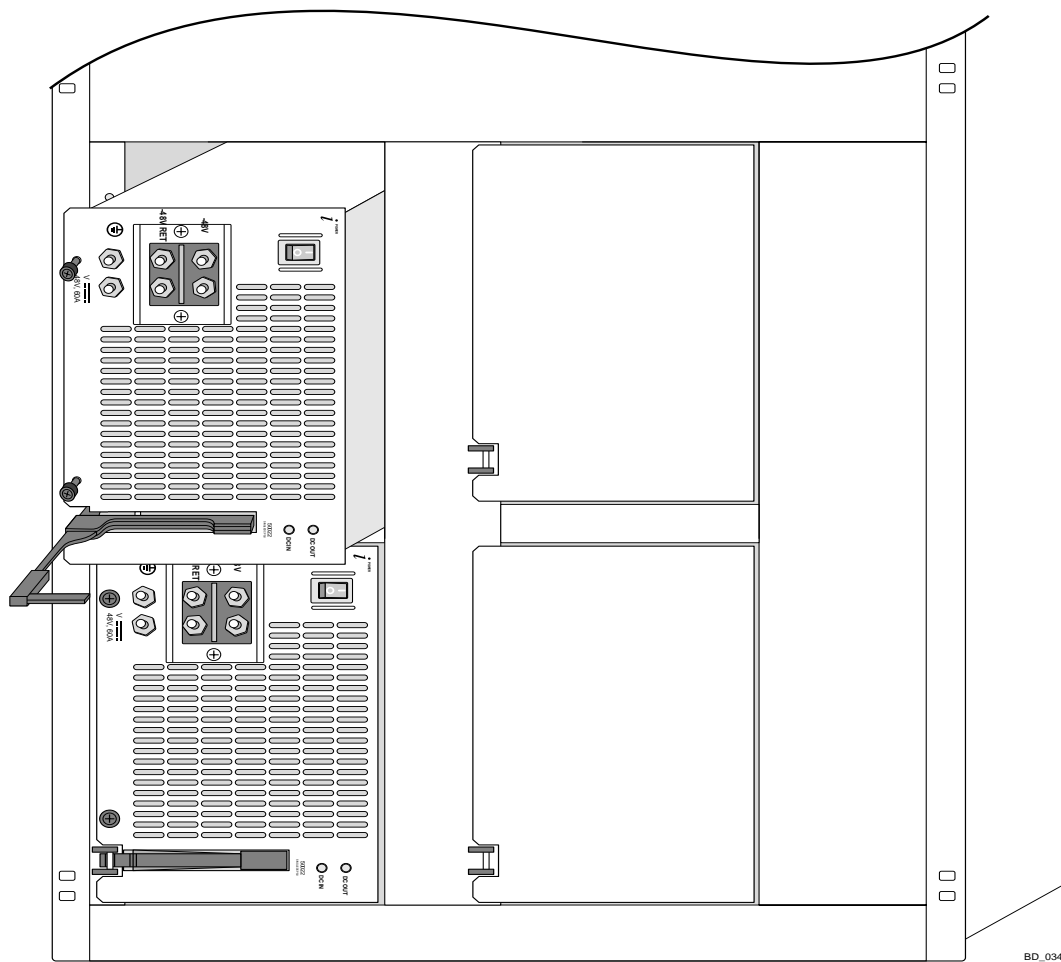
**Table 14-3:** DC Power Supply LED Activity

LED	Color	Indicates
DC in	Green	Input voltage is within range
	Amber	Input voltage is outside of range
	Off	Input voltage is below 12 V
DC out	Green	All DC outputs are operational
	Amber	One or more DC outputs have failed
	Off	Input voltage is below 12 V

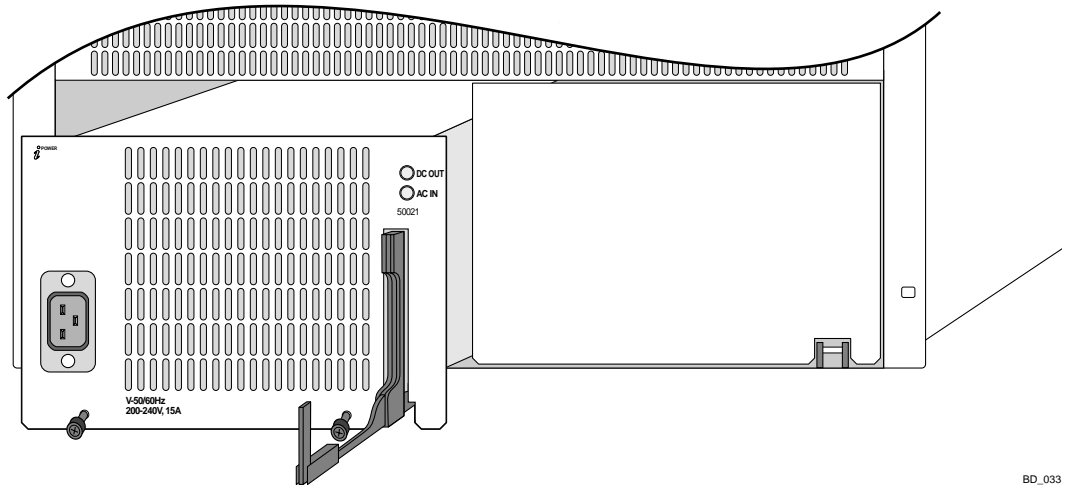
## Installing a BlackDiamond 6800 Series Power Supply

To install the first power supply:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-left corner of the switch front panel.
- 2 Remove the blank faceplate that is covering the power supply bay.
- 3 For the BlackDiamond 6816 switch, ensure that the power supply is right side up, as shown in Figure 14-4, and the locking handle is open.  
  
For the BlackDiamond 6808 switch, ensure that the power supply is right side up, as shown in Figure 14-5, and the locking handle is open.
- 4 If you are installing a DC power supply, you must prepare the DC power supply cable before you install the power supply. See “Preparing the DC Cabling” on page 14-10 for more details. A DC power supply in the BlackDiamond 6816 switch is shown in Figure 14-4.



**Figure 14-4:** Installing a DC power supply in a BlackDiamond 6816



BD\_033

**Figure 14-5:** Installing an AC power supply in a BlackDiamond 6808



*Caution: Do not handle the power supply using the DC output bus bars. Support the power supply from the bottom, while holding the handle on the front of the power supply unit.*

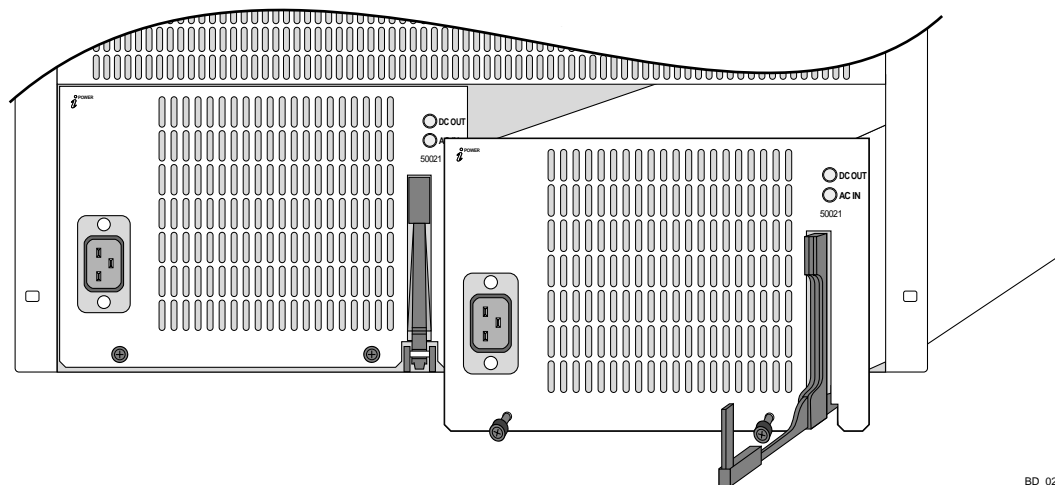
- 5 Gently begin to slide the power supply into the power supply bay.



*Caution: Do not slam the power supply into the backplane. Use the locking handle to secure the power supply unit into the chassis.*

- 6 Secure the power supply in a BlackDiamond 6816 by pushing right on the locking handle until it clicks in place.  
Secure the power supply in a BlackDiamond 6808 by pushing down on the locking handle until it clicks in place.
- 7 Tighten the screws using a #1 Phillips screwdriver.
- 8 To turn on power to the system, connect the power cables to the power supplies and then to the wall outlet. If you have a DC power supply, attach the power cables and turn the on/off switch to the on position. See “Attaching the DC Cabling” on page 14-11 for more information about how to attach the DC cabling to the power supply.
- 9 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.

To install additional power supplies, repeat step 2 through step 8.

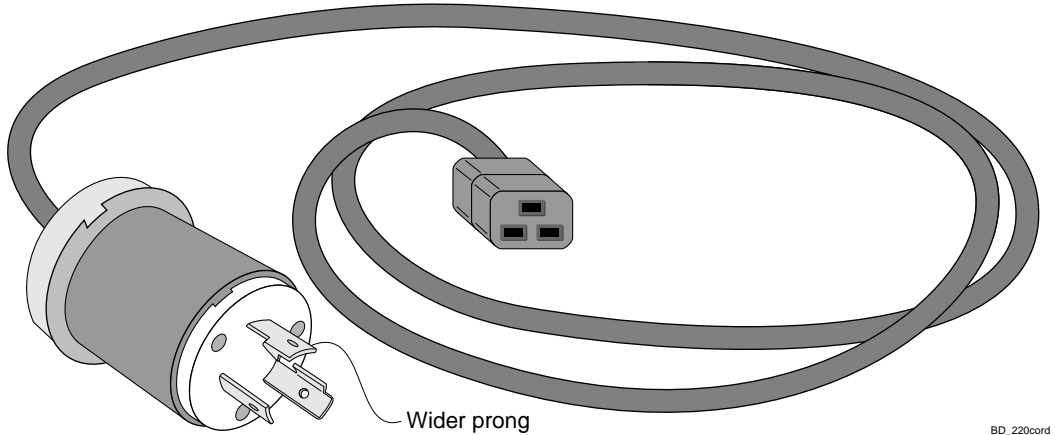


BD\_028

**Figure 14-6:** Installing a second power supply in a BlackDiamond 6808

## AC Power Cable and Plug

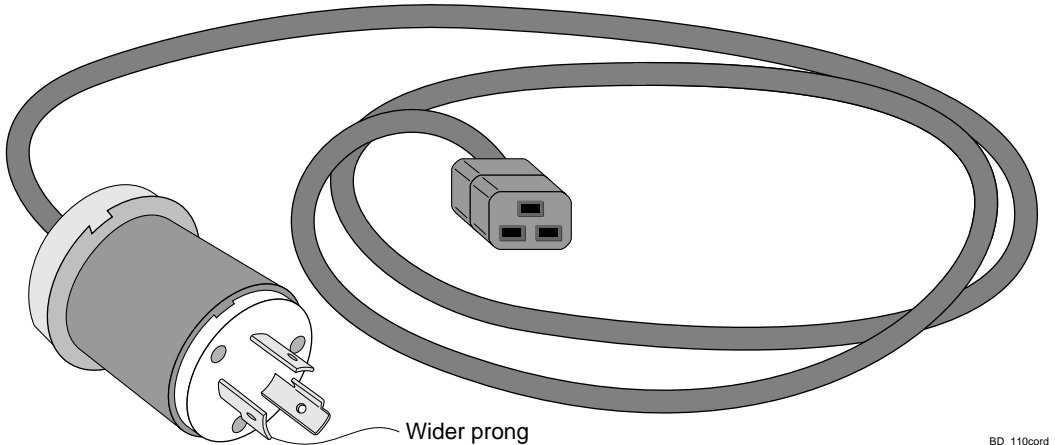
To turn on power to the system, connect the power cables to the power supplies and then to the wall outlet. Figure 14-7 shows the BlackDiamond 6800 series 220 VAC power cable and plug.



BD\_220cord

**Figure 14-7:** BlackDiamond 220 VAC power cable and plug

Figure 14-8 shows the BlackDiamond 6800 series 110 VAC power cable and plug.



BD\_110cord

**Figure 14-8:** BlackDiamond 110 VAC power cable and plug

See “Preparing the DC Cabling” on page 14-10 for details about the -48 VDC power cable and plug.

## Selecting the DC Cabling

Use the following guidelines when selecting cabling for the DC power supplies:

- Each DC power supply requires dedicated 55 A service.
- For DC power cables, use 4 AWG, high-strand-count wire cable.

## Preparing the DC Cabling

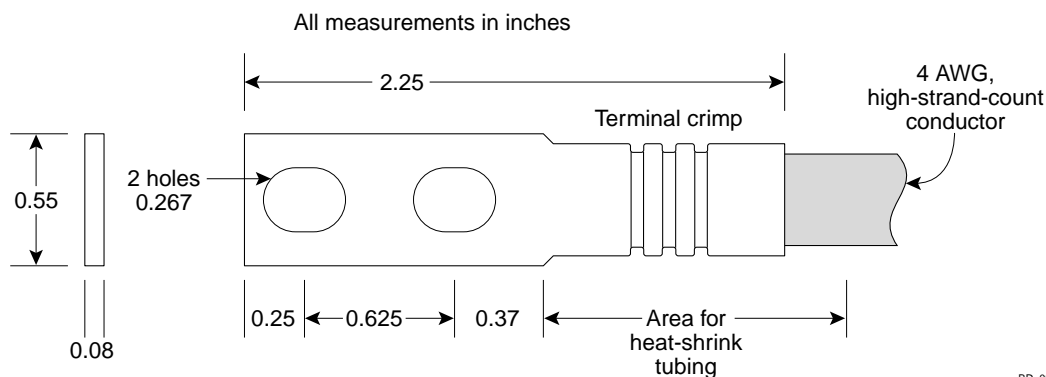
Use the following guidelines when preparing cabling for the DC power supplies:

- Each DC power supply requires dedicated 60 A service.
- For DC power cables, use 4 AWG, high-strand-count wire cable with dual hole lugs that fit over M6 (metric) terminals that are centered 0.625 inch (15.86 mm) apart.
- For convenience, the lock washers and nuts that you use to connect the source DC cables to the power terminals are loosely mounted on the studs of the DC power supply.



*Note: Add a length of heat-shrink tubing to prevent the crimp area on the lug from coming into contact with the metal faceplate of the DC power supply.*

Figure 14-9 shows the specifications of the lug that is used to connect the DC power cable to the DC power supply.



BD\_021

**Figure 14-9:** Dimensions of the DC power cable lugs

Each set of power terminals on the DC power supply consists of two 6-mm, metric-threaded, nickel-plated, brass studs that are centered 0.625 inch (15.86 mm)

apart. The earth ground studs extend 0.52 inch (13.2 mm) above the power supply faceplate; the set of positive (+) and negative (–) studs extend 0.9 inch (22.9 mm) above the faceplate. The nickel plating on the studs enhances conductivity and resists corrosion. The DC power terminals are isolated from the ground terminal.

Use power cables and lugs with the specifications outlined in Table 14-4.

**Table 14-4:** Source DC Power specifications

Characteristic	Specification
DC power cable size	4 AWG, high strand count copper wire
DC power cable lug	Panduit copper, standard barrel, 2-hole lug—Type LDC (Panduit part number: LCD4-14A-L; Thomas & Betts part number: LCN4-14).
Power	1971 W, 42 to 72 VDC

For convenience, the lock washers and nuts for connecting the source DC cables to the power terminals are loosely mounted on the studs ready for use.

## Attaching the DC Cabling

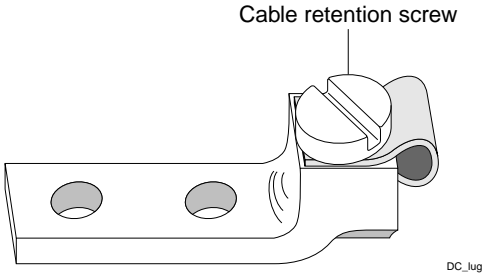
To attach the cable to the lugs, perform the following steps.

- 1 Strip 0.5 inches of insulation from the 4 AWG, high strand-count cable.
- 2 Insert the cable into the cable lugs.



*Caution: Ensure that no copper is visible between the lug and the cable insulation*

- 3 Tighten the cable retention screw, using a  $\frac{1}{4}$ " or  $\frac{5}{16}$ " flathead screwdriver, to 20 in-lbs of torque. The cable retention screw is shown in Figure 14-10.



**Figure 14-10:** 2-stud lug

Each set of power terminals on the DC power supply consists of two 6-mm, metric-threaded, nickel-plated, brass studs centered 0.625 inch apart. The earth ground studs extend 0.52 inch (13.2 mm) above the power supply faceplate; the set of positive (+) and negative (-) studs extend 0.9 inch (22.9 mm) above the faceplate. The nickel plating on the studs enhances conductivity and resists corrosion.

For convenience, the lock washers and nuts for connecting the source DC cables to the power terminals are loosely mounted on the studs ready for use.

## Verifying a Successful Installation

After you supply power to the BlackDiamond switch, each MSM64i performs a POST of its circuitry. The LED labeled “SYS” on the MSM64i blinks amber during the POST. After the MSM64i has passed its POST and is operational, each I/O module performs its own POST.



*Note: See Chapter 15 for more information about switch management module LED activity and Chapter 16 for more information about I/O module LED activity.*

## Removing a BlackDiamond 6800 Series Power Supply

BlackDiamond 6800 series power supplies are hot-swappable. You can add or remove power supplies without turning off power to the chassis and normal operation will continue as long as the switch has enough power to support the installed modules. If you have three or more power supplies installed in a BlackDiamond 6818 or two or more power supplies installed in a BlackDiamond 6808, you can remove one of them without turning off power to the chassis.

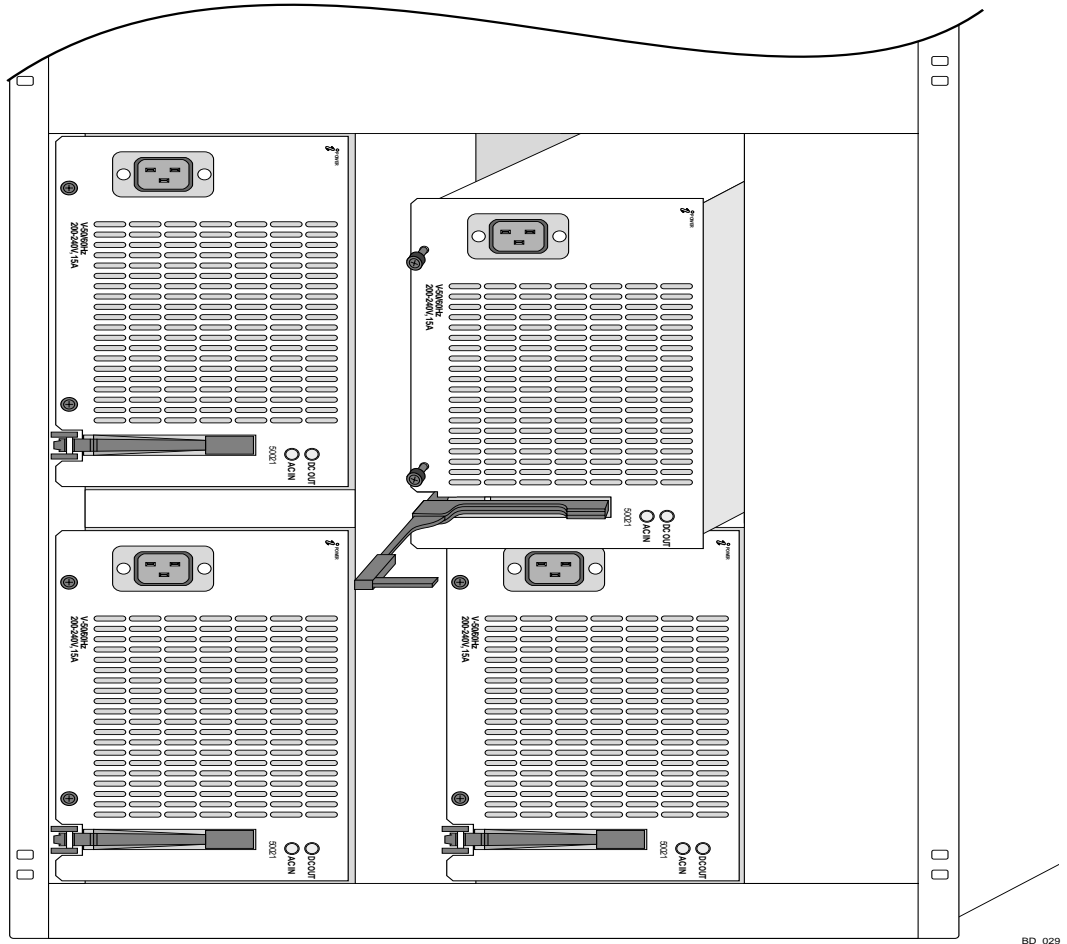
Three types of power supplies are available: 110 VAC, 220 VAC, and -48 VDC. All installed power supplies must be of the same type.

To remove a 110 VAC, 220 VAC, or -48 VDC power supply:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-left corner of the switch front panel.
- 2 Completely remove the power supply cord(s) from the wall outlet and then from the power supply. If you have a DC power supply, turn the on/off switch to the off position and remove the power cables.

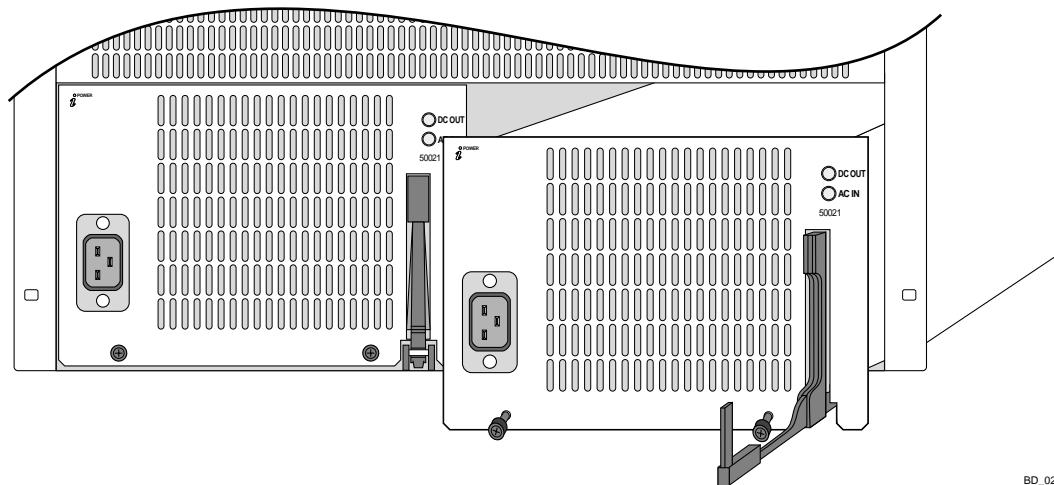
- 3 Unscrew the power supply using a #1 Phillips screwdriver.
- 4 On a BlackDiamond 6816, disengage the power supply by rotating the handle out and to the left, as shown in Figure 14-11.

On a BlackDiamond 6808, disengage the power supply by rotating the handle out and down, as shown in Figure 14-12.



**Figure 14-11:** Removing BlackDiamond 6816 DC power supplies

BD\_029



BD\_028

**Figure 14-12:** Removing BlackDiamond 6808 220 VAC power supplies

- 5 Slowly slide the power supply out of the chassis by grasping the edges of the power supply with both and pulling the power supply towards you. After you pull the power supply towards you, place both hands underneath the power supply to support it as you pull it out of the chassis.



*Caution: The power supply weighs approximately 30 pounds (14 kg).*



*Caution: Do not handle the power supply using the DC output bus bars.*

- 6 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.

15

# BlackDiamond 6800 Series Management Switch Module

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This chapter describes:

- Important information about the BlackDiamond 6800 series Management Switch Fabric Module (MSM64i)
- Installation and removal procedures for the BlackDiamond 6800 series MSM64i

The Management Switch Fabric Module (MSM64i) is the internal switch fabric for data that is being sent between I/O modules. One MSM64i is required for switch operation in both the BlackDiamond 6816 and the BlackDiamond 6808; however, adding more MSM64i modules increases both reliability and throughput. Each MSM64i has two CPUs for protocol processing and network management. For full redundancy, you can install up to four MSM64i modules in the BlackDiamond 6816 switch and up to two MSM64i modules in the BlackDiamond 6808 switch. With full redundancy, the BlackDiamond 6800 series switch is a fully nonblocking switch.

Table 15-1 shows that packet throughput between I/O modules increases when additional MSM64i modules are installed.

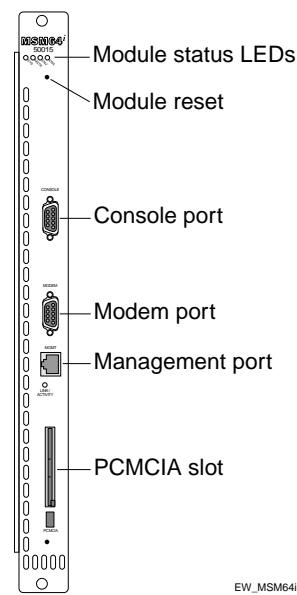
**Table 15-1:** Packet Throughput Between I/O Modules

Chassis	# of MSM64i Modules	Throughput
BlackDiamond 6816	1	64 Gbps
	2	128 Gbps
	3	192 Gbps
	4	256 Gbps

**Table 15-1:** Packet Throughput Between I/O Modules

Chassis	# of MSM64i Modules	Throughput
BlackDiamond 6808	1	64 Gbps
	2	128 Gbps

You can install the MSM64i in one of the designated (orange) slots in the BlackDiamond 6800 series chassis, labeled slot A, B, C, or D on the BlackDiamond 6816 or slot A or B on the BlackDiamond 6808. Figure 15-1 shows the MSM64i.



**Figure 15-1:** Management Switch Fabric Module 64 (MSM64i)

The MSM64i has the following ports:

- Console port—Used to connect a terminal and perform local management.
- Management port—Used to connect an Ethernet cable directly from your laptop into the management port to view and locally manage the switch configurations.
- Modem port —Used to connect a modem for remote access to the CLI.
- PCMCIA slot—Reserved for future use.

See Chapter 1 for more information about management ports.

## MSM64i Activity

The BlackDiamond 6800 series switch can run with a single MSM64i installed. When you install additional MSM64i modules, one of the MSM64i modules operates as the *master*, and the others become the *slave MSM64i*.

The master MSM64i is responsible for upper-layer protocol processing and system management functions. For example, OSPF computation and SNMP functions are performed by the master MSM64i. Packet handling is distributed among the CPUs of all installed MSM64i modules.

Selection of the master MSM64i occurs automatically. The following scenarios describe the selection process:

- When the BlackDiamond 6800 series switch boots with one or more MSM64i modules already installed, and an MSM64i module is installed in slot A, the MSM64i in slot A becomes the master.
- When the BlackDiamond 6800 series switch boots with a single MSM64i (regardless of the slot position), it is selected as the master. If additional MSM64i modules are added to the switch after powered on, the added MSM64i modules become the slaves. MSM64i modules that operate as slaves can be inserted and removed without disrupting network services.

If you remove the master MSM64i while the BlackDiamond 6800 series switch is operating, the slave MSM64i does a soft reset and becomes the master MSM64i.

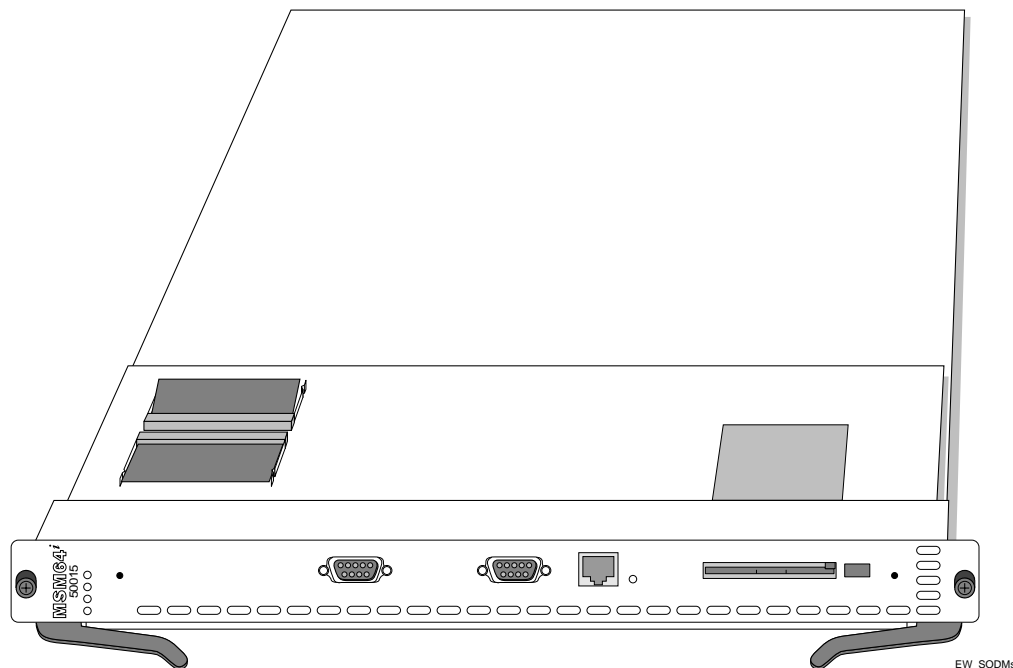
When you save the switch configuration, it is saved to all MSM64i modules. If you download a new ExtremeWare image, the image is downloaded to all MSM64i modules.

## MSM64i Memory

The MSM64i has two 144-pin SODIMM sockets and ships with two 128 MB SODRAM modules installed, as shown in Figure 15-2. The memory capacity can be increased by replacing the SODIMM module(s).



*Note: The MSM64i supports only SODIMMs supplied by Extreme Networks.*



**Figure 15-2:** MSM64i SODIMM sockets

For larger network configurations and larger routing tables, you can add additional memory to the MSM64i. The MSM64i can be populated with any of the memory combinations that are listed in Table 15-2. If you are using multiple MSM64i modules, all modules must have identical memory configurations.

**Table 15-2:** MSM64i SODIMM Memory Combinations

J8	J9	Total Memory
64 MB	64 MB	128 MB
128 MB	0 MB	128 MB
128 MB	64 MB	192 MB
128 MB	128 MB	256 MB

If you are using multiple MSM64i modules, all modules must have identical memory configurations.



*Note: See “Adding SODIMMs to the MSM64i Module” on page 15-8 and “Removing a SODIMM from the MSM64i Module” on page 15-9on for more details.*

## MSM64i LEDs


Table 15-3 describes the LED activity on the MSM64i.

**Table 15-3:** MSM64i LEDs

LED	Color	Indicates
SYS	Green blinking	Normal operation is occurring
	Amber blinking	Diagnostic test is in progress
	Amber	Diagnostic failure has occurred
	Off	Switch is not receiving power
MSTR	Green	Module is operating as master
	Amber	Module is operating as slave
ENV	Green	Environment (temperature, fan, power supply) is operating properly
	Amber	Environmental failure has occurred
ERR	Amber	A critical software error has been logged since power up
	Off	Normal operation is occurring

Table 15-3: MSM64i LEDs

LED	Color	Indicates
Link/Activity	Off	Link is down
	Green	Link is up
	Amber	Packet activity is occurring

 *Note: To reset the critical software error LED (amber ERR LED), use the `clear log static` command and reboot the switch. If you continue to have critical software errors, or the ERR LED is amber after the `clear log static` command and a switch reboot, contact Extreme Networks Customer Support.*

## Installing MSM64i Modules

To install the MSM64i:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-left corner of the switch front panel.
- 2 For the BlackDiamond 6816, ensure that the MSM64i is horizontal with the module name to the left and that the ejector/injector handles are extended, as shown in Figure 15-3.

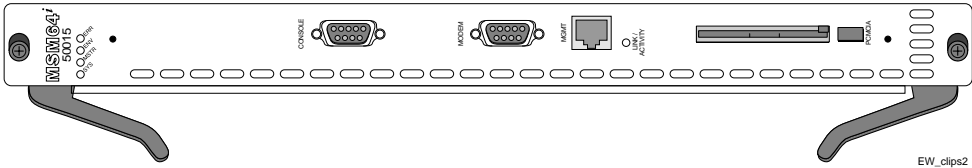
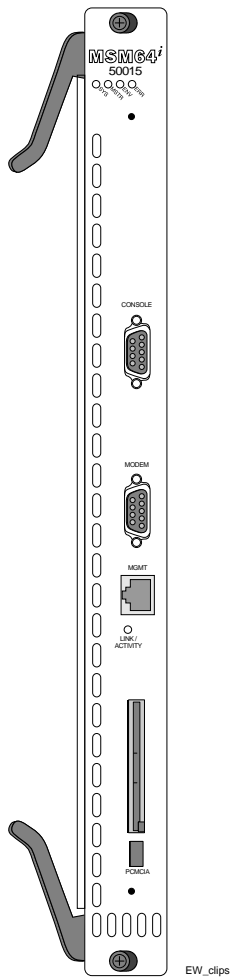


Figure 15-3: MSM64i prior to insertion in BlackDiamond 6816

For the BlackDiamond 6808, ensure that the MSM64i is vertical with the module name at the top and that the ejector/injector handles are extended, as shown in Figure 15-4.



**Figure 15-4:** MSM64i prior to insertion in BlackDiamond 6808

- 3 Slide the MSM64i into the appropriate slot of the chassis (slot A, B, C, or D in the BlackDiamond 6816 or slot A or B in the BlackDiamond 6808), until it makes contact with the backplane.



*Note: Do not touch the PCB. Use the metal back pane, not the PCB, to guide the MSM64i.*

As the MSM64i begins to seat in the chassis, the ejector/injector handles begin to close.

- 4 To close the ejector/injector handles, use both hands simultaneously to push the handles toward the center of the module.
- 5 To secure the module, tighten the two screws with a #1 Phillips screwdriver.



*Note: Tighten the screws before you insert additional modules. Otherwise, you might unseat modules that you have not secured.*

- 6 Repeat this procedure for each additional MSM64i module, if applicable.

After a slave MSM64i is installed, use the `synchronize` command to replicate all saved images and configurations from the master MSM64i to the slave MSM64i.



*Caution: Depending on the size and complexity of your network, you should install and configure a slave MSM64i module when there will be minimal network disruption. You may need to reboot your switch after you use the `synchronize` command.*

- 7 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.



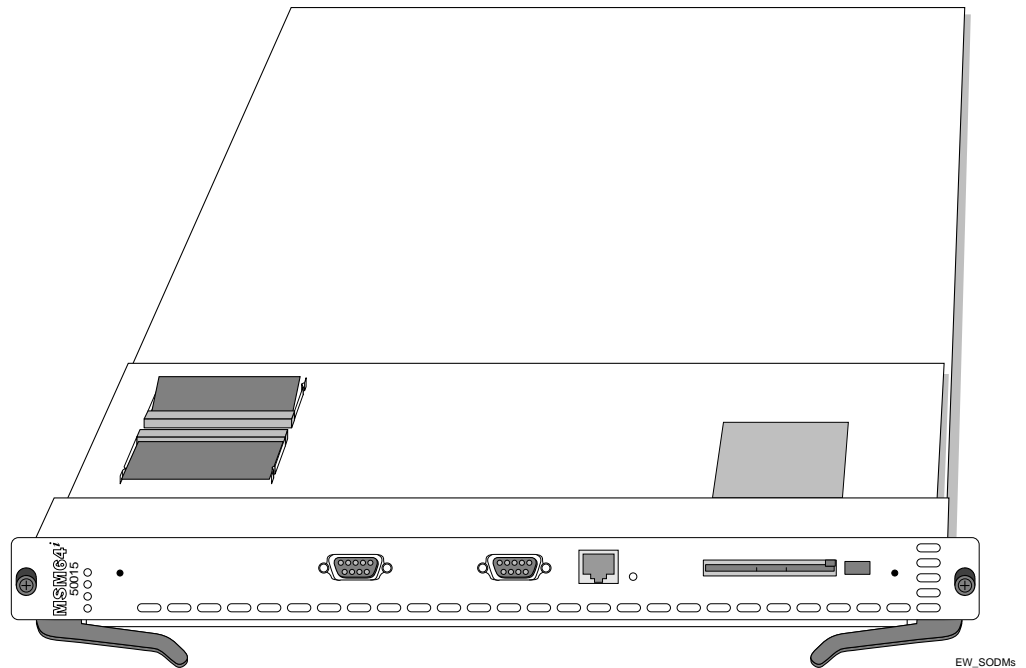
*Caution: You can install the MSM64i only in the designated (orange) slots. The MSM64i does not fit in any other chassis slots.*

## Adding SODIMMs to the MSM64i Module

The MSM64i supports only SODIMMs from Extreme Networks.

To add a SODIMM to the MSM64i:

- 1 Attach an ESD strap to your wrist and connect the metal end to the ground receptacle that is located on the top-left corner of the switch front panel.
- 2 Locate the SODIMM sockets on the MSM64i.
- 3 Position the SODIMM in the socket by ensuring that the gold fingers of the SODIMM slip into the connector and the keying notches align.
- 4 Secure the SODIMM by pressing down firmly until it is locked into the socket and the ejector locks rotate into position, as shown in Figure 15-5.



**Figure 15-5:** Adding a SODIMM

## Removing a SODIMM from the MSM64i Module

To remove a SODIMM:

- 1 Attach an ESD strap to your wrist and connect the metal end to the ground receptacle that is located on the top-left corner of the switch front panel.
- 2 Disengage the SODIMM by pulling out on the ejector locks that are located on either side of the SODIMM.
- 3 Rotate the SODIMM out of the socket.

## Removing MSM64i Modules

All BlackDiamond 6800 series modules (MSM64i and I/O modules) are hot-swappable. You do not need to power off the system to remove or insert a module.

To remove an MSM64i module:

- 1** Attach an ESD strap to your wrist and connect the metal end to the ground receptacle that is located on the top-left corner of the switch front panel.
- 2** To loosen the module, unscrew the screws with a #1 Phillips screwdriver.
- 3** Simultaneously rotate the ejector/injector handles outward to disengage the module from the backplane.
- 4** Slide the module out of the chassis.
- 5** If you are not going to install a replacement MSM64i, cover the slot with a blank faceplate. Otherwise, follow the MSM64i module installation procedure on page 15-6.
- 6** Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.



# 16 BlackDiamond 6800 Series I/O Modules

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This chapter describes:

- Configuration information and specifications for the BlackDiamond 6800 series I/O modules
- Installation and removal procedures for the BlackDiamond 6800 series I/O modules

## Configuring I/O Modules

No configuration information is stored on the I/O modules; all configuration information is stored on the MSM64i module(s).

When the BlackDiamond 6800 series switch is powered on, ExtremeWare generates a default configuration for any slots that contain I/O modules. The default configuration allows the I/O module ports to participate in the VLAN named *default*. The default configuration for the I/O module is not preserved unless you explicitly save the configuration to nonvolatile RAM (NVRAM).

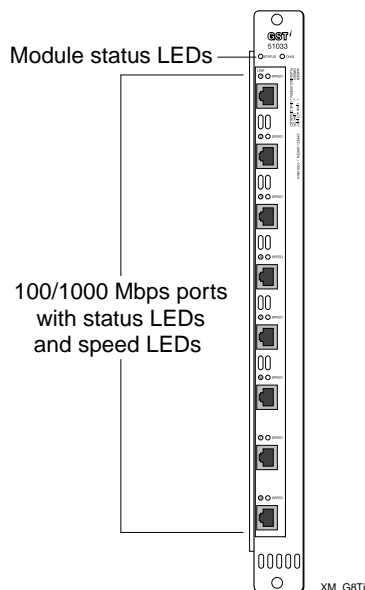
You can configure parameters of the I/O module after it is installed or you can pre-configure a slot for a certain type of module and configuration. The pre-configured information is applied to the module after it is inserted. If you pre-configure a slot for a specific module type, and then insert a different type of module, the module reverts to its default configuration.



*Note: See the ExtremeWare Software User Guide for more information about configuring I/O modules.*

## G8Ti Module

Figure 16-1 shows the G8Ti module.



**Figure 16-1:** G8Ti module

The G8Ti module has eight autosensing 100/1000BASE-T ports that use standard RJ-45 connectors. The default configuration of the G8Ti module is as follows:

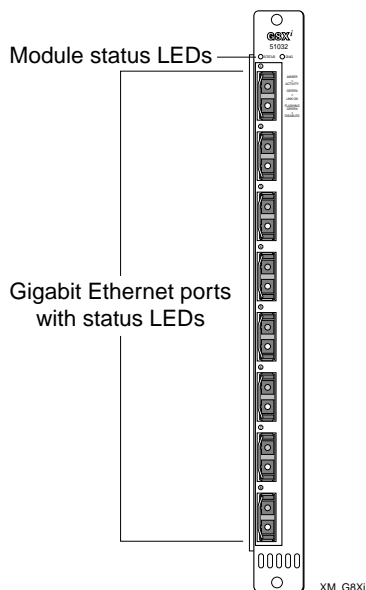
- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in auto-negotiation mode.



*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*

## G8Xi Module

Figure 16-2 shows the G8Xi module.



**Figure 16-2:** G8Xi module

The G8Xi module has eight unpopulated GBIC-based Gigabit Ethernet ports.

All Gigabit Ethernet ports on these modules use standard GBIC connectors and support 1000BASE-SX, 1000BASE-LX, 1000BASE-LX70, and 1000BASE-ZX. The default configuration of the G8Xi module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in auto-negotiation mode.



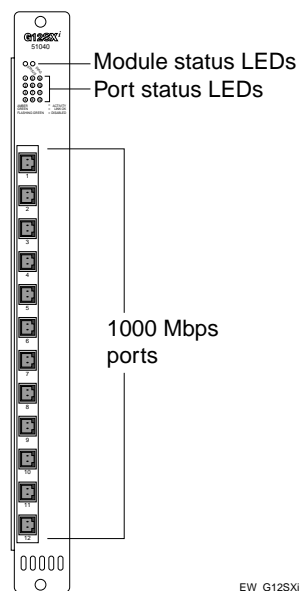
*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*



*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*

## G12SXi Module

Figure 16-3 shows the G12SXi module.



**Figure 16-3:** G12SXi module

The G12SXi module has 12 Gigabit Ethernet ports that use standard MT-RJ connectors, and supports 1000BASE-SX only. The default configuration of the G12SXi module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in auto-negotiation mode.



*Note: See Table 1-4 in Chapter 1 for information about supported GBIC types and distances.*

## Software Requirements

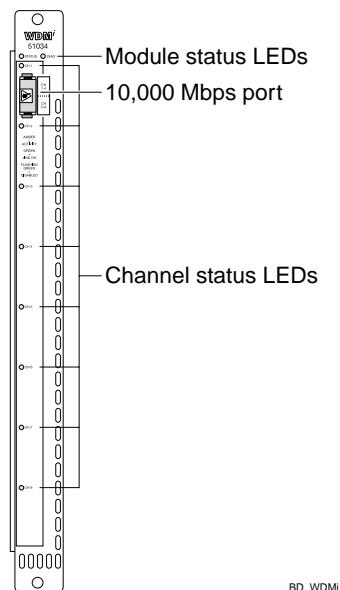
The G12SXi module requires that you load ExtremeWare version 6.1.4 or later on the switch.



*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*

## WDMi Module

Figure 16-4 shows the WDMi module.



**Figure 16-4:** WDMi module

The WDMi module has one 10 Gbps port, which supports eight full-duplex Gigabit Ethernet channels. The port transmits over a pair of single mode fiber cables using wavelength division multiplexing. The port uses an SC-APC duplex connector with a spring-loaded safety cover. APC connectors are polished at an 8° angle to minimize loss and reflections over extended transmit distances.

The default configuration of the WDMi module is as follows:

- The port is added to the default VLAN as untagged.
- The port inherits the properties of the default VLAN (protocol type, VLANid, and so forth).

The WDMi module transmits bi-directionally on both fiber cables and then multiplexes these wavelengths over the single-mode optical fiber.

Table 16-1 describes the specifications for the WDMi optical interface.

**Table 16-1:** WDMi Optical Interface Specifications

Parameter	Minimum	Typical	Maximum
<b>Transmitter</b>			
Optical output power	-5 dBm	-3 dBm	1 dBm
Channel 1 wavelength	1495 nm	1501 nm	1507 nm
Channel 2 wavelength	1515 nm	1521 nm	1527 nm
Channel 3 wavelength	1535 nm	1541 nm	1547 nm
Channel 4 wavelength	1555 nm	1561 nm	1567 nm
<b>Receiver</b>			
Optical input power sensitivity	-17 dBm		
Optical input power maximum			-1 dBm
<b>Fiber Optic Cable</b>			
Back reflection			-25 dB

Extreme Networks recommends that you reserve 3 dB for losses due to cable splices, connectors, and operating margin. Table 16-2 describes the cable attenuation, cable budget, and operating distance for a variety of cable attenuation ratings for the WDMi module.

**Table 16-2:** WDMi Maximum Transmit Distances

Cable Attenuation	Cable Budget	Maximum Distance
0.20 dB/km	9 dB	45 km
0.25 dB/km	9 dB	36 km
0.30 dB/km	9 dB	30 km

A minimum of 2 dB attenuation is required to prevent saturation of the receiver.

## Software Requirements

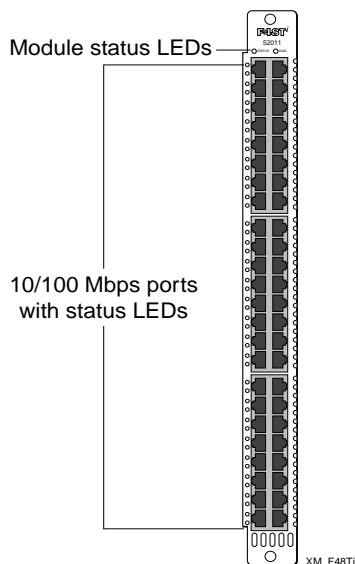
The WDMi module requires that you load ExtremeWare version 6.1.5 or later on the switch.



*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*

## F48Ti Module

Figure 16-5 shows the F48Ti module.



**Figure 16-5:** F48Ti module

The F48Ti has 48 autosensing 10BASE-T/100BASE-TX ports. All ports use standard RJ-45 connectors.

The default configuration of the F48Ti module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in auto-negotiation mode.

## Software Requirements

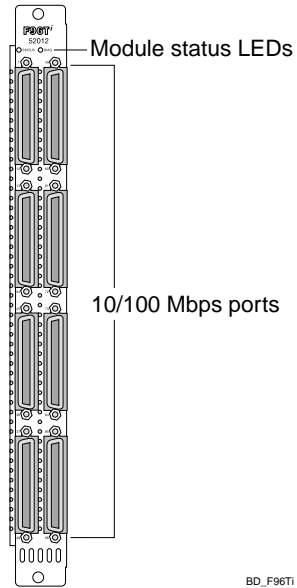
The F48Ti module requires ExtremeWare version 6.1.4 or later.



*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*

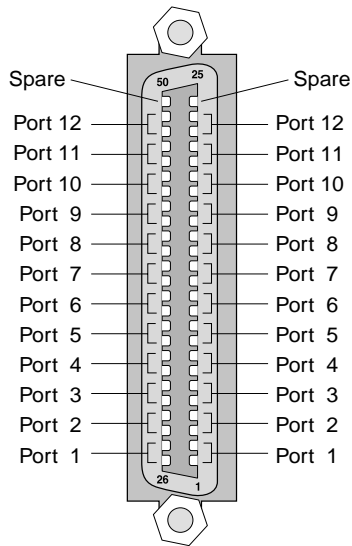
## F96Ti Module

Figure 16-6 shows the F96Ti module.



**Figure 16-6:** F96Ti module

The F96Ti has 96 10BASE-T/100BASE-TX ports available through eight RJ-21 telco connectors. The RJ-21 connector is shown in Figure 16-7.



BD\_037

**Figure 16-7:** One RJ-21 connector yields 12 10/100 ports

Table 16-3 describes the pinouts for the RJ-21 connector.

**Table 16-3:** Connector Pinouts for the RJ-21 Connector

RJ-45 Number	RJ-21 Pin Numbers	RJ-45 Pin Numbers
1	1, 2, 26, 27	2, 6, 1, 3
2	3, 4, 28, 29	2, 6, 1, 3
3	5, 6, 30, 31	2, 6, 1, 3
4	7, 8, 32, 33	2, 6, 1, 3
5	9, 10, 34, 35	2, 6, 1, 3
6	11, 12, 36, 37	2, 6, 1, 3
7	13, 14, 38, 39	2, 6, 1, 3
8	15, 16, 40, 41	2, 6, 1, 3
9	17, 18, 42, 43	2, 6, 1, 3
10	19, 20, 44, 45	2, 6, 1, 3
11	21, 22, 46, 47	2, 6, 1, 3
12	23, 24, 48, 49	2, 6, 1, 3

Table 16-4 describes the output signals for the RJ-21 connector.

**Table 16-4:** Output Signals for the RJ-21 Connector

RJ-21 Pin Numbers	Output Signal	RJ-21 Pin Numbers	Output Signal
1	RxD (-)	26	RxD (+)
2	TxD (-)	27	TxD (+)
3	RxD (-)	28	RxD (+)
4	TxD (-)	29	TxD (+)
5	RxD (-)	30	RxD (+)
6	TxD (-)	31	TxD (+)
7	RxD (-)	32	RxD (+)
8	TxD (-)	33	TxD (+)
9	RxD (-)	34	RxD (+)
10	TxD (-)	35	TxD (+)
11	RxD (-)	36	RxD (+)
12	TxD (-)	37	TxD (+)
13	RxD (-)	38	RxD (+)
14	TxD (-)	39	TxD (+)
15	RxD (-)	40	RxD (+)
16	TxD (-)	41	TxD (+)
17	RxD (-)	42	RxD (+)
18	TxD (-)	43	TxD (+)
19	RxD (-)	44	RxD (+)
20	TxD (-)	45	TxD (+)
21	RxD (-)	46	RxD (+)
22	TxD (-)	47	TxD (+)
23	RxD (-)	48	RxD (+)
24	TxD (-)	49	TxD (+)

Table 16-5 describes the cable specifications for the RJ-21 connector.

**Table 16-5:** F96Ti Cable Specifications

Connectors	Cable	Min Length	Max Length
Lucent 525 Telco 50-pin RJ-21	Shielded trunk cable with 12 CAT5 twisted pairs	1 m	100 m

To access the ports, use a 180-degree connector with a shielded PVC trunk cable:

- Through a patch panel by terminating the cable and shield with an RJ-21 connector.
- Directly by using a cable that is terminated with 12 RJ-45 connectors.

Appropriate cables are available from your local supplier.

The default configuration of the F96Ti module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in auto-negotiation mode.

**Software Requirements**

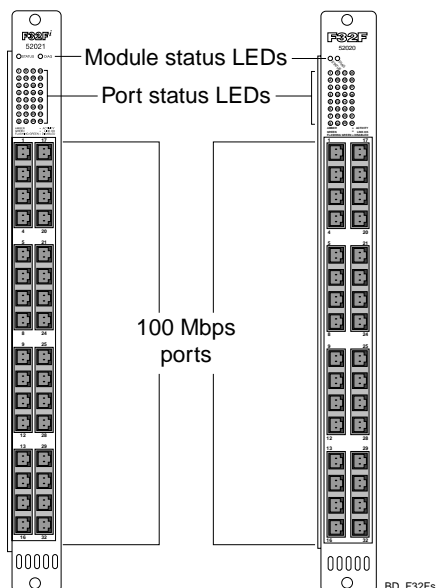
The F96Ti module requires that you load ExtremeWare version 6.1.8 or later and BootROM 6.5 or later on the switch.



*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*

## F32F and F32Fi Modules

Figure 16-8 shows the F32F and F32Fi modules.



**Figure 16-8:** F32F and F32Fi modules

All F32F and F32Fi ports have 32 100BASE-FX ports and use standard MT-RJ connectors. The F32F module is available only for the BlackDiamond 6808 switch. The F32Fi module is available only for the BlackDiamond 6816 switch.

The default configuration of the F32F and F32Fi modules is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (protocol type, VLANid, and so forth).
- All ports operate in 100 Mbps, full-duplex mode. Half-duplex mode is not supported.

## Software Requirements

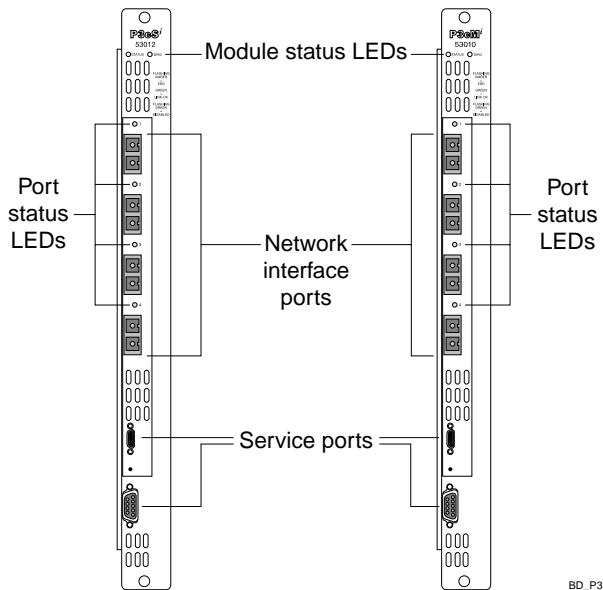
The F32Fi module requires that you load ExtremeWare version 6.1.8 or later and BootROM 6.5 or later on the switch.



*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*

## P3cSi and P3cMi Modules

Figure 16-9 shows the P3cSi and P3cMi modules.



**Figure 16-9:** P3cSi and P3cMi modules

The P3cSi and P3cMi each have four OC-3 ports that use duplex SC connectors. The P3cSi supports single mode fiber-optic cable only, and the P3cMi supports multimode fiber-optic cable only. These modules connect the switch to a SONET infrastructure that is used by metropolitan area service providers and operators of server co-location networks.

The default configuration of the P3cSi and P3cMi modules is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (VLANid and so forth).

Table 16-6 describes the specifications for the P3cSi and P3cMi optical interfaces.

**Table 16-6:** Optical Interface Specifications for the P3cSi and P3cMi

Parameter	P3cSi	P3cMi
Power budget	13 dB	9 dB
Operating wavelength	1310 nm	1310 nm
Transmit distance	15 km	2 km

## Software Requirements

The P3cSi and P3cMi modules require that you load ExtremeWare version 6.1.5 build 20 or later on the MSM64i module and on the P3cSi and P3cMi modules, BootROM 6.5 or later on the MSM64i module, and BootROM 1.4.4 or later on the P3cSi and P3cMi modules. For more information about software requirements and module configuration, see the *Packet Over SONET Module Installation and User Guide*.



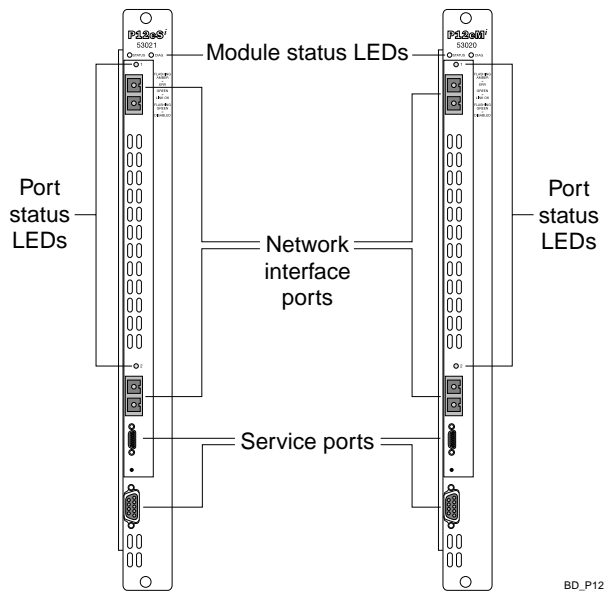
*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*



*Note: During the P3cSi or P3cMi module boot up, the Status and Diag LEDs may be incorrectly lit to solid green or solid amber. The LEDs reflect their true state after approximately 30 seconds when the module has completed its boot cycle.*

## P12cSi and P12cMi Modules

Figure 16-10 shows the P12cSi and P12cMi modules.



**Figure 16-10:** P12cSi and P12cMi modules

The P12cSi and P12cMi each have two OC-12 ports that use duplex SC connectors. The P12cSi supports single mode fiber-optic cable only, and the P12cMi supports multimode fiber-optic cable only. These modules connect the switch to a SONET infrastructure that is used by metropolitan area service providers and operators of server co-location networks.

The default configuration of the P12cSi and P12cMi modules is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (VLANid and so forth).

Table 16-7 describes the specifications for the P12cSi and P12cMi optical interfaces.

**Table 16-7:** Optical Interface Specifications for the P12cSi and P12cMi

Parameter	P12cSi	P12cMi
Power budget	13 dB	10 dB
Operating wavelength	1310 nm	1310 nm
Transmit distance	15 km	500 m

## Software Requirements

The P12cSi and P12cMi modules require that you load ExtremeWare version 6.1.8 build 12 or later on the MSM64i module and on the P12cSi and P12cMi modules, BootROM 7.0 or later on the MSM64i module, and BootROM 1.14 or later on the P12cSi and P12cMi modules. For more information about software requirements and module configuration, see the *Packet Over SONET Module Installation and User Guide*.



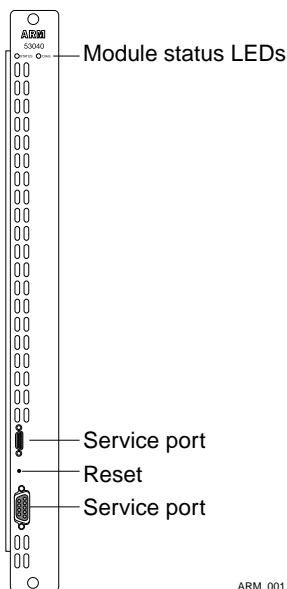
*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*



*Note: During the P12cSi or P12cMi module boot up, the Status and Diag LEDs may be incorrectly lit to solid green or solid amber. The LEDs reflect their true state after approximately 30 seconds when the module has completed its boot cycle.*

## ARM

Figure 16-11 shows the Accounting and Routing Module (ARM).



**Figure 16-11:** Accounting and Routing Module

The ARM contains a powerful set of network processors that are specifically programmed to implement the IP routing and accounting function. The module has no external ports, but contains four full-duplex Gigabit Ethernet internal ports that connect to the BlackDiamond backplane switch fabric. Each internal processor provides media-speed packet processing for two internal full-duplex Gigabit Ethernet ports. The ARM operates in a one-armed fashion:

- Receiving frames from the switch fabric.
- Processing the frames.
- Transmitting the frames back into the switch fabric which then sends them to the appropriate I/O module.

### Software Requirements

The ARM requires that you load ExtremeWare version 6.1.5 build 20 or later on the MSM64i module and on the ARM, BootROM 6.5 or later on the MSM64i module, and

BootROM 1.4.4 or later on the ARM. For more information about software requirements and module configuration, see the *Accounting and Routing Module Installation and User Guide*.



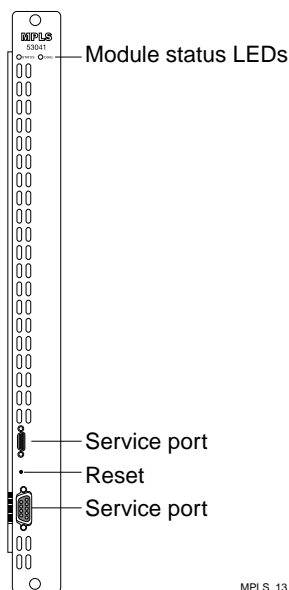
*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*



*Note: During the ARM boot up, the Status and Diag LEDs may be incorrectly lit to solid green or solid amber. The LEDs reflect their true state after approximately 30 seconds when the module has completed its boot cycle.*

## MPLS Module

Figure 16-12 shows the MPLS module.



**Figure 16-12:** MultiProtocol Label Switching (MPLS) module

The MultiProtocol Label Switching (MPLS) module contains a powerful set of network processors that are specifically programmed to implement the MPLS function. The module has no external ports, but contains four full-duplex Gigabit Ethernet internal ports that connect to the BlackDiamond backplane switch fabric. Each internal processor provides media-speed packet processing for two internal full-duplex Gigabit Ethernet ports. The MPLS module operates in a one-armed fashion:

- Receiving frames from the switch fabric.
- Processing the frames.
- Transmitting the frames back into the switch fabric which then sends them to the appropriate I/O module.

### Software Requirements

The MPLS module requires that you load ExtremeWare version 6.1.8 build 12 or later on the MSM64i module and on the MPLS module, BootROM 7.0 or later on the MSM64i

module, and BootROM 1.14 or later on the MPLS module. For more information about software requirements and module configuration, see the *MPLS Module Installation and User Guide*.



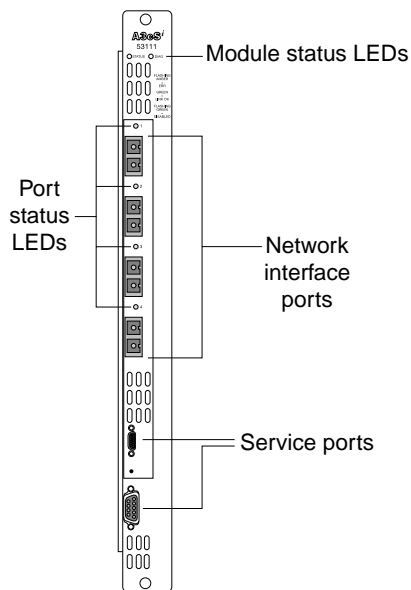
*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*



*Note: During the MPLS module boot up, the Status and Diag LEDs may be incorrectly lit to solid green or solid amber. The LEDs reflect their true state after approximately 30 seconds when the module has completed its boot cycle.*

## A3cSi Module

Figure 16-13 shows the A3cSi module.



**Figure 16-13:** A3cSi module

The A3cSi module has four OC-3 ports, using duplex SC connectors. The A3cSi supports single mode fiber-optic cable only.

These modules connect the switch to an Asynchronous Transfer Mode (ATM) infrastructure. Key applications for the ATM module are:

- Interconnecting metropolitan area networks across an ATM network infrastructure.
- Interconnecting server co-location network sites directly using ATM links.
- Providing connectivity between a legacy Enterprise ATM network and an Ethernet backbone.

The default configuration of the A3cSi module is as follows:

- All ports are added to the default VLAN as untagged.
- All ports inherit the properties of the default VLAN (VLANid and so forth).

Software Requirements

The A3cSi module requires that you load ExtremeWare version 6.1.8 build 12 or later on the MSM64i module and on the A3cSi module, BootROM 7.2 or later on the MSM64i module, and BootROM 1.18 or later on the A3cSi module. For more information about software requirements and module configuration, see the *Asynchronous Transfer Mode (ATM) Module Installation and User Guide*.



*Note: See “I/O Module LEDs,” on page 16-24 for information on LED activity.*



*Note: During the A3cSi module boot up, the Status and Diag LEDs may be incorrectly lit to solid green or solid amber. The LEDs reflect their true state after approximately 30 seconds when the module has completed its boot cycle.*

I/O Module LEDs

Table 16-8 describes the LED activity on the I/O modules.

**Table 16-8:** BlackDiamond I/O Module LEDs

LED	Color	Indicates
Status	Green blinking	Normal operation
	Amber blinking	Configuration error, code version error, diagnostic failure, or other severe module error
	Off	No power
DIAG	Off	Normal operation
	Amber blinking	Diagnostics in progress
	Amber	Diagnostic failure
Port x	Green	Link up
	Green blinking	Link down
	Amber blinking	Packet activity
	Off	Link down

# Installing I/O Modules

You can insert I/O modules at any time, without causing disruption of network services.

To install an I/O module:

**1** Select a slot for the module:

- Slots numbered 1 through 16 in the BlackDiamond 6816
- Slots numbered 1 through 8 in the BlackDiamond 6808



*Caution: You can install I/O modules only in slots 1 through 16 in the BlackDiamond 6816 or slots 1 through 8 in the BlackDiamond 6808. I/O modules do not fit in slots A, B, C, or D. Forceful insertion can damage the I/O module.*

- 2** Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-left corner of the switch front panel.
- 3** For the BlackDiamond 6816, ensure that the module is horizontal with the module name to the left and that the ejector/injector handles are extended.

For the BlackDiamond 6808, ensure that the module is vertical with the module name at the top and that the ejector/injector handles are extended.

- 4** Slide the module into the appropriate slot of the chassis (slots 1 through 16 in the BlackDiamond 6816 or slots 1 through 8 in the BlackDiamond 6808), until it makes contact with the backplane.

As the module begins to seat in the chassis, the ejector/injector handles begin to close.

- 5** To close the ejector/injector handles, use both hands simultaneously to push the handles toward the center of the module.
- 6** To secure the module, tighten the two screws using a #1 Phillips screwdriver.



*Note: Tighten the screws before inserting additional modules. Otherwise, you might unseat modules that you have not secured.*

- 7** Repeat this procedure for additional modules, if applicable.
- 8** Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.

## Removing I/O Modules

All BlackDiamond 6800 series modules (MSM64i and I/O modules) are hot-swappable. You do not need to power off the system to remove a module.

To remove an I/O module:

- 1** Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-left corner of the switch front panel.
- 2** Use a #1 Phillips screwdriver to unscrew the two captive screws.
- 3** Simultaneously rotate the ejector/injector handles outward to disengage the module from the backplane.
- 4** Slide the module out of the chassis.
- 5** If you are not going to install a replacement I/O module, cover the slot with a blank faceplate. Otherwise, follow the I/O module installation procedure on page 16-25.
- 6** Repeat this procedure for additional modules, if applicable.
- 7** Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.



# BlackDiamond 6800 Series Switch Fan Tray

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This chapter describes:

- Important facts about the fan trays for the BlackDiamond 6818 and BlackDiamond 6808 switches
- Installation and removal procedures for the BlackDiamond 6818 and BlackDiamond 6816 switch fan trays

## BlackDiamond 6816 Fan Trays

The BlackDiamond 6816 fan trays:

- Contain nine individual fans
- Are accessed from the front of the chassis
- Are hot-swappable which means you can remove and replace a fan tray without powering down the system
- Can be removed and installed by customers



*Caution: Do not cover or obstruct the fan ventilation holes at the side of the unit. Doing so can result in overheating and possible damage to the BlackDiamond 6816 switch. Thermal sensors will shut down the BlackDiamond 6816 switch if the internal temperature exceeds 60 degrees Celsius.*

ExtremeWare monitors the fan trays in the BlackDiamond 6816 switch for failure and overheat conditions. All fan failures and over temperature events cause the switch to

send alerts to the network management station or to the switch log. See the *ExtremeWare Software User Guide* for more information on switch monitoring.

## BlackDiamond 6808 Fan Tray

The BlackDiamond 6808 fan tray (no. 50013):

- Contains three individual fans
- Is accessed from the rear of the chassis
- Is hot-swappable which means you can remove and replace the fan tray without powering down the system
- Can be removed and installed by customers



*Caution: Do not cover or obstruct the fan ventilation holes at the rear of the unit. Doing so can result in overheating and possible damage to the BlackDiamond 6808 switch. Thermal sensors will shut down the BlackDiamond 6808 switch if the internal temperature exceeds 60 degrees Celsius.*

ExtremeWare monitors the fan trays in the BlackDiamond 6808 switch for failure and overheat conditions. All fan failures and over temperature events cause the switch to send alerts to the network management station or to the switch log. See the *ExtremeWare Software User Guide* for more information on switch monitoring.

## Removing a BlackDiamond 6800 Series Fan Tray

BlackDiamond 6800 series fan trays are hot-swappable. You do not need to turn off power to a BlackDiamond 6800 series switch to remove a fan tray.

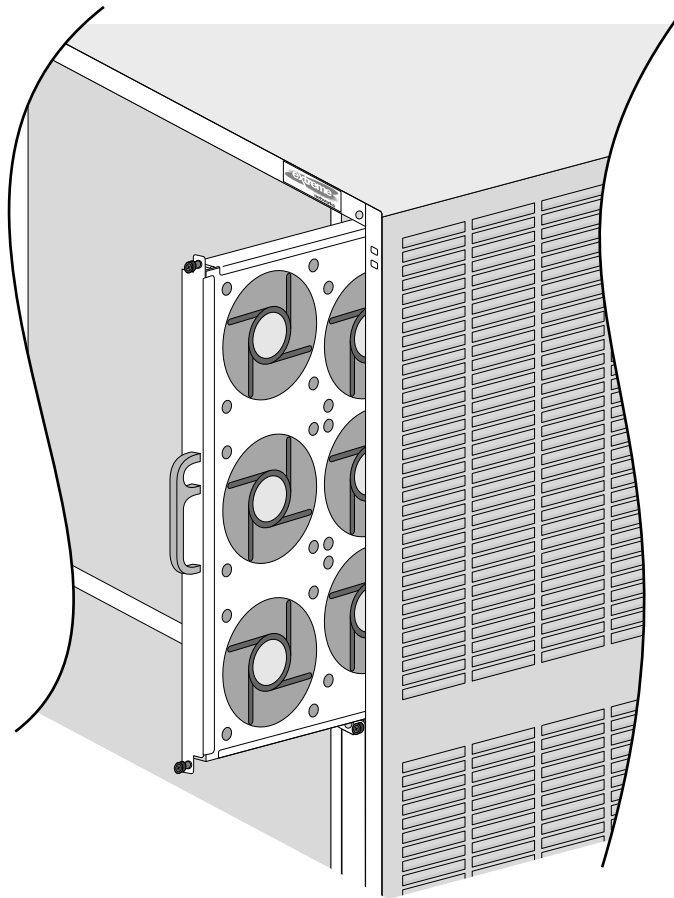
To remove a fan tray from the BlackDiamond 6816 or BlackDiamond 6808 switch:

- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-left corner of the switch front panel.
- 2 For the BlackDiamond 6816 switch, use a #1 Phillips screwdriver to unscrew the two screws that secure the fan tray on the front of the chassis. Put screws aside in a safe place.

For the BlackDiamond 6808 switch, use a #1 Phillips screwdriver to unscrew the ten screws that secure the fan tray to the rear of the chassis. Put the screws aside in a safe place.

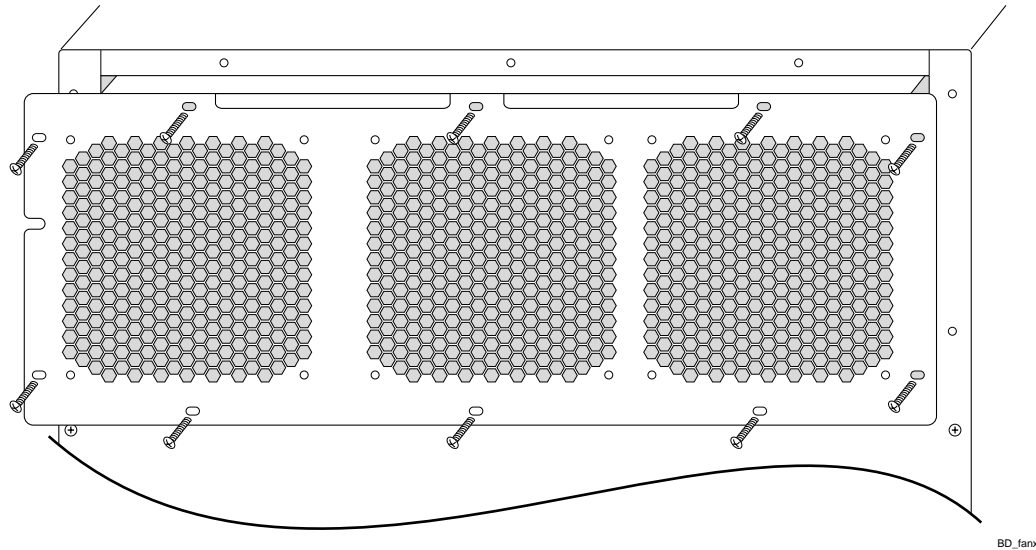
- 3 For the BlackDiamond 6816 switch, use the handle on the front of the fan tray to pull it straight out of the chassis approximately  $\frac{1}{2}$  inch (12.7 mm), as shown in Figure 17-1. This action disconnects the power to the fan tray.

For the BlackDiamond 6808 switch, grasp the edges of the fan tray and pull it out of the chassis approximately  $\frac{1}{2}$  inch (12.7 mm), as shown in Figure 17-2. This action disconnects power to the fan tray.



BD\_030

**Figure 17-1:** Removing the BlackDiamond 6816 fan tray



**Figure 17-2:** Removing the BlackDiamond 6808 fan tray

- 4 Allow the fan blades to stop spinning before removing the fan tray completely.



*Warning: Keep your hands your away from rotating fan blades.*

- 5 Repeat this procedure for additional fan trays, if applicable.
- 6 Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.

## Installing a BlackDiamond 6800 Series Fan Tray

BlackDiamond 6800 series fan trays are hot-swappable. You do not need to turn off power to a BlackDiamond 6800 series switch to install a fan tray.

To install a fan tray into the BlackDiamond 6816 or BlackDiamond 6808 switch:

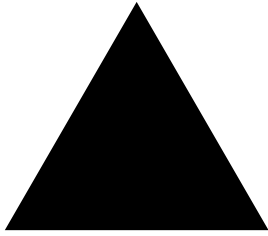
- 1 Attach the ESD strap that is provided to your wrist and connect the metal end to the ground receptacle that is located on the top-left corner of the switch front panel.
- 2 Gently begin to insert the new fan tray into the bay.



*Note: If the chassis is powered on, the fan blades will begin turning as soon as the tray makes contact with the backplane.*

- 3** To secure the fan tray, turn the screws clockwise until they become tight.
- 4** Leave the ESD strap permanently connected to the chassis, so that it is always available when you need to handle ESD-sensitive components.





# Part 6: Switch Operation

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# 18 Initial Switch and Management Access

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This chapter describes:

- How to power on an Extreme Networks Switch
- How to check the switch installation using the Power On Self-Test (POST)
- How to connect equipment to the console port
- How to log in to the switch

## Powering On the Switch

This section describes how to supply power to a Summit switch, Alpine switch, or BlackDiamond switch. For more information about a specific switch model, see the switch-specific section in this guide.

### Powering On the Summit Switch

To turn on power to the switch, connect the AC power cable to the power supply and then to the wall outlet. For the Summit4, Summit24, and Summit48 switches, turn the on/off switch to the on position.



*Note: The Summit1i, Summit51, Summit71, and Summit48i switches do not have on/off switches.*

## Powering On the Alpine Switch

To turn on power to the switch, connect the power cord to the power supply and then to the wall outlet. If you install more than one power supply, connect a power cord to each power supply and then to a different wall outlet.

## Powering On the BlackDiamond Switch

To turn on power to the switch, connect the power cord to the power supply and then to the wall outlet. If you install more than one power supply, connect a power cord to each power supply and then to a different wall outlet. If you have a DC power supply, turn the on/off switch to the on position.

## Verifying the Installation

This section describes the events that indicate a successful installation for a Summit switch, an Alpine switch, or a BlackDiamond switch after you turn on power to your switch.

### Verifying Successful Installation on the Summit Switch

After you supply power to the Summit switch, the switch performs a power-on self test (POST).

During the POST, all ports are temporarily disabled, the packet LED is off, the power LED is on, and the MGMT LED flashes. The MGMT LED flashes until the switch successfully passes the POST.

If the switch passes the POST, the MGMT LED blinks at a slow rate (one blink per second). If the switch fails the POST, the MGMT LED shows a solid yellow light.



*Note: See Chapter 4 for more information about Summit LEDs.*

### Verifying a Successful Installation on the Alpine Switch

After you supply power to the Alpine switch, the integrated Switch Management Module (Alpine 3802) or the SMMi (Alpine 3804 and Alpine 3808) performs a POST. The LED labeled “DIAG” on the chassis (Alpine 3802) or on the SMMi (Alpine 3804 and Alpine 3808) blinks green during the POST. After the integrated management module or

the SMMi has passed its POST and is operational, each I/O module then performs its own POST.



*Note: See Chapter 9 for more information about switch management module LED activity and Chapter 10 for more information about I/O module LED activity.*

## Verifying a Successful Installation on the BlackDiamond Switch

After you supply power to the BlackDiamond switch, each MSM64i performs a POST of its circuitry. The LED labeled “SYS” on the MSM64i blinks amber during the POST. After the MSM64i has passed its POST and is operational, each I/O module performs its own POST.



*Note: See Chapter 15 for more information about switch management module LED activity and Chapter 16 for more information about I/O module LED activity.*

## Connecting Equipment to the Console Port

Connection to the console port is used for direct local management. The console port settings are:

- **Baud rate** — 9600
- **Data bits** — 8
- **Stop bit** — 1
- **Parity** — None
- **Flow control** — XON/XOFF

The terminal or PC with terminal-emulation software that you connect to any Summit, Alpine, or BlackDiamond switch must be configured with these settings. This procedure is described in the documentation supplied with the terminal.

Appropriate cables are available from your local supplier, or you can make your own. Table 18-1 describes the pinouts for a DB-9 male console connector.

**Table 18-1:** Pinouts for the Console Connector

Function	Pin Number	Direction
DCD (data carrier detect)	1	In
RXD (receive data)	2	In
TXD (transmit data)	3	Out
DTR (data terminal ready)	4	Out
GND (ground)	5	-
DSR (data set ready)	6	In
RTS (request to send)	7	Out
CTS (clear to send)	8	In

Figure 18-1 shows the pinouts for a 9-pin to 25-pin (RS-232) null-modem cable.

**Switch**

Cable connector: 9-pin female

Screen	Shell	●
TxD	3	●
RxD	2	●
Ground	5	●
RTS	7	●
CTS	8	●
DSR	6	●
DCD	1	●
DTR	4	●

**PC/Terminal**

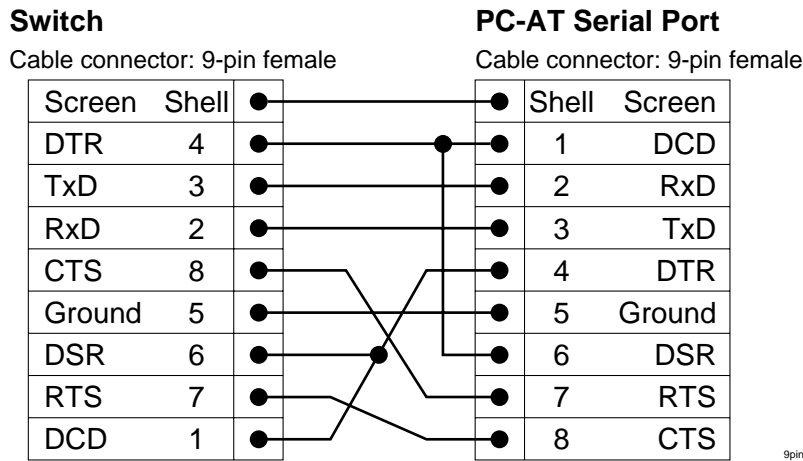
Cable connector: 25-pin male/female

●	1	Screen
●	3	RxD
●	2	TxD
●	7	Ground
●	4	RTS
●	20	DTR
●	5	CTS
●	6	DSR
●	8	DCD

25pin

**Figure 18-1:** Null-modem cable pinouts

Figure 18-2 shows the pinouts for a 9-pin to 9-pin (PC-AT) null-modem serial cable.



**Figure 18-2:** PC-AT serial null-modem cable pinouts

## Logging In for the First Time

After your switch has completed all POSTs, it is operational. When the switch is operational, you can log in and configure an IP address for the default VLAN (named *default*).

To manually configure the IP settings:

- 1 Connect a terminal or PC with terminal-emulation software to:
  - The console port for Summit switches
  - The SMMi for the Alpine 3808 and Alpine 3804 switches
  - The console port for the Alpine 3802 switch
  - The MSM64i for BlackDiamond switches
- 2 At your terminal, press [Return] one or more times until you see the login prompt.

- 3 At the login prompt, enter the default user name *admin* to log on with administrator privileges. For example:

```
login: admin
```

Administrator capabilities allow you to access all switch functions.



*Note: For more information about logging in to the switch and configuring switch management access, see the ExtremeWare Software User Guide.*

- 4 At the password prompt, press [Return].

This is because the default user name, *admin*, has no password assigned to it. When you have successfully logged on to the system, the command-line prompt displays the system name (for example, `BlackDiamond6800>` in its prompt).



*Note: For more information about how to make a specific system name, see the ExtremeWare Software User Guide.*

- 5 Assign an IP address and subnetwork mask for VLAN *default* by typing:

```
config vlan default ipaddress 123.45.67.8 255.255.255.0
```

Your changes take effect immediately.

- 6 Save your configuration changes so that they will be in effect after the next system reboot, by typing:

```
save
```

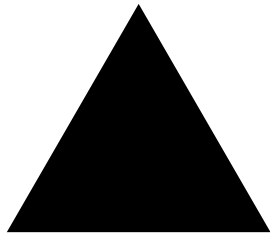
The configuration is saved to the configuration database of the SMMi modules in the Alpine switch and both MSM64i modules in the BlackDiamond switch.



*Note: For more information about saving configuration changes, see the ExtremeWare Software User Guide.*

- 7 When you are finished with these tasks, log out of the switch by typing:

```
logout
```



# Part 7: Appendices

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# Safety Information

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## Important Safety Information



*Warning: Read the following safety information thoroughly before installing your Extreme Networks switch. Failure to follow this safety information can lead to personal injury or damage to the equipment.*

Installation and removal of a switch chassis or its components must be done by qualified service personnel only.

Qualified service personnel have had appropriate technical training and experience that is necessary to be aware of the hazards to which they are exposed when performing a task and of measures to minimize the danger to themselves or other people.

Install the unit only in a temperature- and humidity-controlled indoor area that is free of airborne materials that can conduct electricity. Too much humidity can cause a fire. Too little humidity can produce electrical shock and fire.

## Power

The Summit series switch has either one or two power inputs depending on the switch model. The Alpine 3800 series switch has either one or two power inputs depending on the switch model. The BlackDiamond 6816 has either four 220 VAC power inputs, eight 110 VAC power inputs, or eight -48 VDC power inputs. The BlackDiamond 6808 has either two 220 VAC power inputs, four 110 VAC power inputs, or four -48 VDC power inputs.

- Disconnect power before removing the back panel of an Alpine switch or BlackDiamond switch.
- The unit must be grounded. Do not connect the power supply unit to an AC outlet without a ground connection.
- The unit must be connected to a grounded outlet to comply with European safety standards.
- The socket outlet must be near the unit and easily accessible. You can only remove power from the unit by disconnecting the power cord from the outlet.
- This unit operates under Safety Extra Low Voltage (SELV) conditions according to the IEC 950 standard. The conditions are only maintained if the equipment to which it is connected also operates under SELV conditions.
- The appliance coupler (the connector to the unit and not the wall plug) must have a configuration for mating with an EN60320/IEC320 appliance inlet.
- *France and Peru only*  
This unit cannot be powered from IT<sup>†</sup> supplies. If your supplies are of IT type, this unit must be powered by 230 V (2P+T) via an isolation transformer ratio 1:1, with the secondary connection point labeled Neutral and connected directly to ground.

## Power Cord

The power cord must be approved for the country where it is used:

- USA and Canada
  - The cord set must be UL-listed and CSA-certified.
  - The minimum specification for the flexible cord is No. 18 AWG (1.5 mm<sup>2</sup>), Type SVT or SJT, 3-conductor.
  - The cord set must have a rated current capacity of at least the amount rated for each specific product.
  - The AC attachment plug must be an Earth-grounding type with a NEMA 5-15P (10 A, 125 V) configuration.
- Denmark
  - The supply plug must comply with section 107-2-D1, standard DK2-1a or DK2-5a.
- Switzerland
  - The supply plug must comply with SEV/ASE 1011.

- Argentina
  - The supply plug must comply with Argentinian standards.

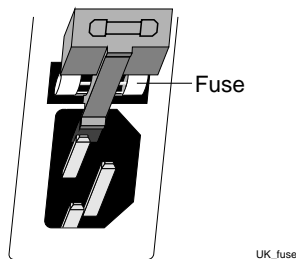
## Fuse

This information only pertains to the the Summit series of switches, with the exception of the Summit7i.

The unit automatically adjusts to the supply voltage, and it is suitable for both 110 VAC and 200-240 VAC operation.

To change the fuse in a Summit series switch:

- 1 To change the fuse, disconnect power from the unit before opening the fuse holder cover.
- 2 Release the fuse holder by gently levering a small screwdriver under the fuse holder catch.
- 3 Replace the fuse. Use only fuses of the same manufacturer, rating, and type as the original.
- 4 Close the fuse holder.



To comply with European safety standards, a spare fuse must not be fitted to the appliance inlet. Use only fuses of the same manufacturer, make, and type.

## Connections

**Fiber Optic ports - Optical Safety.** Never look at the transmit LED/laser through a magnifying device while it is powered on. Never look directly at a fiber port on the switch or at the ends of fiber cable when they are powered on.

This is a Class 1 laser device.



*Warning: Use fiber optic ports only for data communications applications that require optical fiber. Use only with the appropriate connector. When not in use, replace dust cover. Using this module in ways other than those described in this manual can result in intense heat that can cause fire, property damage, or personal injury.*

## Lithium Battery

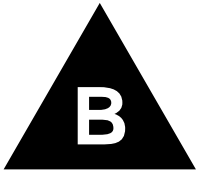
The battery in the bq4830/DS1644 device is encapsulated and not user-replaceable. The battery is located on the SMMi for the Alpine switch, and the MSM motherboard for the BlackDiamond switch.

If service personnel disregard the instructions and attempt to replace the bq4830/DS1644, replace the lithium battery with the same or equivalent type, as recommended by the manufacturer.



*Warning: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.*

- Disposal requirements vary by country and by state.
- Lithium batteries are not listed by the Environmental Protection Agency (EPA) as a hazardous waste. Therefore, they can typically be disposed of as normal waste.
- If you are disposing of large quantities, contact a local waste-management service.
- No hazardous compounds are used within the battery module.
- The weight of the lithium contained in each coin cell is approximately 0.035 grams.
- Two types of batteries are used interchangeably:
  - CR chemistry uses manganese dioxide as the cathode material.
  - BR chemistry uses poly-carbonmonofluoride as the cathode material.



# Technical Specifications

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This appendix describes the technical specifications of the Extreme Networks family of switches:

- Summit “i” series Switch Specifications on page B-2
- Summit non-“i” series Switch Specifications on page B-5
- Summit24e2 Switch Specifications on page B-6
- Summit24e3 Switch Specifications on page B-7
- SummitPx1 Application Switch Specifications on page B-8
- Alpine 3800 series Switch Specifications on page B-9
- BlackDiamond 6800 series Switch Specifications on page B-11
- Common Switch Specifications on page B-13

Table B-1: Summit “i” series Switch Specifications

<b>Physical Dimensions</b>	
	<b>Summit1i</b> Height: 3.5 inches (8.9 cm) Width: 17.25 inches (43.8 cm) Depth: 19.0 inches (48.3 cm) Weight: 22 lbs (10 kg)
	<b>Summit5i</b> Height: 3.5 inches (8.9 cm) Width: 17.25 inches (43.8 cm) Depth: 19.0 inches (48.3 cm) Weight (single power supply): 21.7 lbs (9.8 kg) Weight (dual power supply): 27.4 lbs (12.4 kg)
	<b>Summit7i</b> Height: 7.0 inches (17.8 cm) Width: 17.25 inches (43.8 cm) Depth: 19.0 inches (48.3 cm) Weight (single power supply): 45 lbs (20.4 kg) Weight (dual power supply): 55 lbs (24.9 kg)
	<b>Summit48i</b> Height: 3.5 inches (8.9 cm) Width: 17.25 inches (43.8 cm) Depth: 19.0 inches (48.3 cm) Weight: 24 lbs (10.8 kg)
	<b>Summit48si</b> Height: 1.75 inches (4.45 cm) Width: 18.3 inches (46.5 cm) Depth: 19.0 inches (48.3 cm) Weight: 14 lbs (6.35 kg)
<b>Safety</b>	
Certifications and Standards	UL 1950 3rd Edition, listed EN60950:1992/A1-4:1997 plus ZB/ZC Deviations IEC 950CB Low Voltage Directive (LVD) CSA 22.2#950-95 AS/NZS 3260 EN60825-1 FCC CFR 21

<b>Electromagnetic Interference/Compatibility (EMI/EMC) Certifications and Standards</b>	FCC CFR 47 part 15 Class A ICES-0003 A/C108.8-M1983 Class A VCCI Class A AS/NZS 3548 EN55022:1998 Class A CISPR 22:1998 Class A EN55024:1998 includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2, 3 CNS 13438 Class A
<b>Heat Dissipation</b>	<b>Summit1i</b> 163 W maximum (556 BTU/hr maximum) <b>Summit5i</b> 308 W maximum (1051 BTU/hr maximum) <b>Summit7i</b> 601 W maximum (2049 BTU/hr maximum) <b>Summit48i</b> 140 W maximum (477 BTU/hr maximum) <b>Summit48si</b> 180 W maximum (613 BTU/hr maximum)
<b>Power Supplies</b>	<b>Summit1i</b> AC Line Frequency 50 Hz to 60 Hz Input Voltage Options 85 VAC to 250 VAC Current Rating 100-120/200-240 VAC 3/1.5 A <b>Summit5i</b> AC Line Frequency 50 Hz to 60 Hz Input Voltage Options 100 VAC to 240 VAC Current Rating 100-120/200-240 VAC 4/2 A <b>Summit7i</b> AC Line Frequency 50 Hz to 60 Hz Input Voltage Options 90 VAC to 264 VAC Current Rating 100-120/200-240 VAC 10/5 A <b>Summit48i</b> AC Line Frequency 50 Hz to 60 Hz Input Voltage Options 85 VAC to 250 VAC Current Rating 100-120/200-240 VAC 3/1.5 A <b>Summit48si</b>

AC Line Frequency	50 Hz to 60 Hz, auto ranging
Input Voltage Options	100 VAC to 240 VAC
Current Rating	100-120/200-240 VAC 3/1.5 A
<b>Switch Power-Off</b>	
Temperature power-off	<b>Summit1i, Summit5i, Summit48i</b> Power-One supplies: 75° to 80° C (167° to 176° F) <b>Summit 7i</b> Martek supplies: 75° C (167° F)

**Table B-2: Summit non-“i” series Switch Specifications**

<b>Physical Dimensions</b>	
	<b>Summit4, Summit4FX, Summit24, Summit48</b> Height: 3.5 inches (8.9 cm) Width: 17.32 inches (44 cm) Depth: 17.32 inches (44 cm) Weight: 22 lbs (10 kg)
<b>Safety</b>	
Certifications and Standards	UL 1950 3rd Edition, listed cUL listed to CSA 22.2#950  TUV GS mark & GOST safety approval to the following EN standards: <ul style="list-style-type: none"><li>■ EN60950:1992/A3:1995 plus Deviations</li><li>■ EN60825-1; 1994, all 1996 ZB/ZC</li></ul>
<b>Electromagnetic Compatibility Certifications and Standards</b>	FCC CFR 47 part 15 Class A ICES-0003 A/C108.8-M1983 Class A VCCI Class A AS/NZS 3548 EN55022:1998 Class A CISPR 22:1998 Class A EN55024:1998 includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2, 3 CNS 13438 Class A
<b>Heat Dissipation</b>	135 W maximum (341.2 BTU/hr maximum)
<b>Power Supply</b>	
AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	90 VAC to 264 VAC, auto-ranging
Current Rating	100-120/200-240 VAC 3.0/1.5 A
<b>Switch Power-Off</b>	
Temperature power-off	<b>Summit 24/48</b>  Digital supplies, not Rev. C1: Not drifting: 65° to 70° C (149° to 158° F) Drifting: 50° C (122° F)  Digital supplies, Rev. C1: 70° to 75° C (158° to 167° F)  Power-One supplies, Rev. OL and earlier: 60° to 65° C (140° to 149° F)  Power-One supplies, Rev. OM and later: 75° C (167° F)

**Table B-3:** Summit24e2 Switch Specifications

<b>Physical Dimensions</b>	
Height: 1.73 inches (4.4 cm) Width: 17.32 inches (44 cm) Depth: 14.4 inches (37 cm) Weight: 15.4 lbs (7 kg)	
<b>Safety</b>	
Certifications and Standards	UL 1950 3rd Edition, listed EN60950:1992/A1-4:1997 plus ZB/ZC Deviations IEC 950CB Low Voltage Directive (LVD) CSA 22.2#950-95 AS/NZS 3260 EN60825-1 FCC CFR 21
<b>Electromagnetic Compatibility Certifications and Standards</b>	
FCC CFR 47 part 15 Class A ICES-0003 A/C108.8-M1983 Class A VCCI Class A AS/NZS 3548 EN55022:1998 Class A CISPR 22:1998 Class A EN55024:1998 includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2, 3 CNS 13438 Class A	
<b>Heat Dissipation</b>	400 W maximum (1365 BTU/hr maximum)
<b>Power Supply</b>	
AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	100 VAC to 240 VAC, auto-ranging

**Table B-4: Summit24e3 Switch Specifications**

<b>Physical Dimensions</b>	
Height: 1.75 inches (4.44 cm) Width: 17 inches (43.18 cm) Depth: 8 inches (20.32 cm) Weight: 8 lbs (3.6 kg)	
<b>Safety</b>	
Certifications and Standards	UL 1950 3rd Edition, listed EN60950:1992/A1-4:1997 plus ZB/ZC Deviations IEC 950CB Low Voltage Directive (LVD) CSA 22.2#950-95 AS/NZS 3260 EN60825-1 FCC CFR 21
<b>Electromagnetic Compatibility Certifications and Standards</b>	
FCC CFR 47 part 15 Class A ICES-0003 A/C108.8-M1983 Class A VCCI Class A AS/NZS 3548 EN55022:1998 Class A CISPR 22:1998 Class A EN55024:1998 includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2, 3 CNS 13438 Class A	
<b>Heat Dissipation</b>	135 W maximum (341.2 BTU/hr maximum)
<b>Power Supply</b>	
AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	90 VAC to 264 VAC, auto-ranging
Current Rating	100-120/200-240 VAC 2.0/1.0 A

**Table B-5:** SummitPx1 Application Switch Specifications

<b>Physical Dimensions</b>	
Height: 1.75 inches (4.44 cm) Width: 17.25 inches (43.82 cm) Depth: 19 inches (48.26 cm) Weight: 16.75 lbs (7.54 kg)	
<b>Safety</b>	
Certifications and Standards	UL 1950 3rd Edition, listed EN60950:1992/A1-4:1997 plus ZB/ZC Deviations IEC 950CB Low Voltage Directive (LVD) CSA 22.2#950-95 AS/NZS 3260 EN60825-1 FCC CFR 21
<b>Electromagnetic Interference/Compatibility (EMI/EMC) Certification and Standards</b>	FCC CFR 47 part 15 Class A ICES-0003 A/C108.8-M1983 Class A VCCI Class A AS/NZS 3548 EN55022:1998 Class A CISPR 22:1998 Class A EN55024:1998 includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2, 3 CNS 13438 Class A
<b>Heat Dissipation</b>	100 W maximum (341.44 BTU/hr maximum)
<b>Power Supply</b>	
AC Line Frequency	47 Hz to 63 Hz
Input Voltage Options	100 to 120 VAC and 200 to 240 VAC, auto-ranging
Current Rating	100-120/200-240 VAC 1.0/0.5 A

**Table B-6:** Alpine 3800 series Switch Specifications

<b>Physical Dimensions</b>	
Alpine Switches	<b>Alpine 3808</b> Height: 21 inches (53.30 cm) Width: 17.32 inches (44 cm) Depth: 11.375 inches (28.90 cm) Weight, empty chassis: 50 pounds (22.7 kg) Weight, fully loaded chassis: 98 pounds (44.5 kg) Weight, each power supply: 14 pounds (6.4 kg) Weight, each module: 3 pounds (1.4 kg) <b>Alpine 3804</b> Height: 10.5 inches (26.65 cm) Width: 17.32 inches (44 cm) Depth: 15.53 inches (39.42 cm) Weight, empty chassis: 30 pounds (13.6 kg) Weight, fully loaded chassis: 68 pounds (30.9 kg) Weight, each power supply: 14 pounds (6.4 kg) Weight, each module: 3 pounds (1.4 kg) <b>Alpine 3802</b> Height: 7 inches (17.78 cm) Width: 17.422 inches (44.25 cm) Depth: 11.885 inches (30.19 cm) Weight, empty chassis: 30 pounds (13.6 kg) Weight, fully loaded chassis: 40 pounds (18.1 kg) Weight, each module: 3 pounds (1.4 kg)
<b>Safety</b>	
Certifications and Standards	UL 1950 3rd Edition, listed EN60950:1992/A3:1995 plus ZB/ZC Deviations IEC 950CB Low Voltage Directive (LVD) CSA 22.2#950-95 AS/NZS 3260 EN60825-1 FCC CFR 21
<b>Electromagnetic Interference/Compatibility (EMI/EMC) Certification and Standards</b>	FCC CFR 47 part 15 Class A ICES-0003 A/C108.8-M1983 Class A VCCI Class A AS/NZS 3548 EN55022:1998 Class A CISPR 22:1998 Class A EN55024:1998 includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2, 3 CNS 13438 Class A

<b>Telecommunications</b>	NEBS Type IV, Level 3 EN300 386-2 V1.1.3 (1997)
<b>Heat Dissipation</b>	<b>Alpine 3808</b> 1046 W maximum (3600 BTU/hr maximum) <b>Alpine 3804</b> 577 W maximum (2000 BTU/hr maximum) <b>Alpine 3802</b> 318 W maximum (1100 BTU/hr maximum)
<b>Power Supplies</b>	
<b>Alpine 3808</b>	
AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	90 VAC to 264 VAC, auto-ranging
Current Rating	100-120 VAC 10 A 200-240 VAC 5 A -40 - -70 VDC 30 A
<b>Alpine 3804</b>	
AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	90 VAC to 264 VAC, auto-ranging
Current Rating	100-120 VAC 5.6 A 200-240 VAC 2.3 A -40 - -70 VDC 16.5 A
<b>Alpine 3802</b>	
AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	90 VAC to 264 VAC, auto-ranging
Current Rating	100-120 VAC 3.1 A 200-240 VAC 1.3 A -40 - -70 VDC 9.1 A
<b>Switch Power-Off</b>	
Temperature power-off	Martek supplies: 75° C (167° F)

**Table B-7: BlackDiamond 6800 series Switch Specifications**

<b>Physical Dimensions</b>	
BlackDiamond Switches	<b>BlackDiamond 6816</b> Height: 61.25 inches (155.6 cm) Width: 19 inches (48.3 cm) Depth: 19 inches (48.3 cm) Weight, empty chassis: 140 lbs (63.5 kg) Weight, fully loaded chassis: 360 lbs (163.3 kg) Weight, each power supply: 30 to 33 lbs (13.6 to 15.0 kg) Weight, each module: 5 lbs (2.3 kg) <b>BlackDiamond 6808</b> Height: 26.25 inches (66.7 cm) Width: 17.32 inches (44 cm) Depth: 18 inches (45.7 cm) Weight, empty chassis: 60 lbs (27.2 kg) Weight, fully loaded chassis: 170 lbs (77.1 kg) Weight, each power supply: 30 to 33 lbs (13.6 to 15.0 kg) Weight, each module: 5 lbs (2.3 kg)
<b>Safety</b>	
Certifications and Standards	UL 1950 3rd Edition, listed EN60950:1992/A1-4:1997 plus ZB/ZC Deviations IEC 950CB Low Voltage Directive (LVD) CSA 22.2#950-95 AS/NZS 3260 EN60825-1 FCC CFR 21
<b>Electromagnetic Interference/ Compatibility (EMI/EMC) Certifications and Standards</b>	FCC CFR 47 part 15 Class A ICES-0003 A/C108.8-M1983 Class A VCCI Class A AS/NZS 3548 EN55022:1998 Class A CISPR 22:1998 Class A EN55024:1998 includes IEC 61000-4-2, 3, 4, 5, 6, 8, 11 EN 61000-3-2, 3 CNS 13438 Class A
<b>Heat Dissipation</b>	
	<b>220 VAC Power Supply</b> 2544 W maximum (8687 BTU/hr maximum) <b>110 VAC Power Supply</b> 2661 W maximum (9088 BTU/hr maximum) <b>-48 DC Power Supply</b> 2708 W maximum (9246 BTU/hr maximum)

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**Power Supplies**

**220 VAC Power Supply**

AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	200 VAC to 240 VAC, auto ranging
Current Rating	200 VAC 15 A
Weight	33.0 lbs (15.0 kg)

**110 VAC Power Supply**

AC Line Frequency	50 Hz to 60 Hz
Input Voltage Options	100 VAC to 240 VAC, auto ranging
Current Rating	100/200 VAC 15/7.5 A
Weight	33.0 lbs (15.0 kg)

**-48 DC Power Supply**

Input Voltage Options	-48 VDC to -60 VDC, auto ranging
Current Rating	-48 VDC 60 A
Weight	31.75 lbs (14.4 kg)










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**Switch Power-Off**

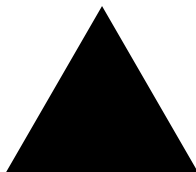
Temperature power-off	Original supply, not DC and not high-output: 75° C (167° F) DC Supply: Stand-alone: 65° to 70° C (149° to 158° F) In chassis: 70° C (158° F) High-output: 75° C (167° F)
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**Table B-8: Common Switch Specifications**

Environmental Requirements	
Operating Temperature	0° to 40° C (32° to 104° F)
Storage Temperature	-40° to 70° C (-40° to 158° F) -10° to 70° C (14° to 158° F) (Alpine 3802 only)
Operating Humidity	10% to 95% relative humidity, noncondensing
Standards	EN60068 to Extreme IEC68 schedule
Certification Marks	
	CE (European Community)
	TUV/GS (German Notified Body)
	TUV/S (Argentina)
	GOST (Russian Federation)
	ACN 090 029 066 C-Tick (Australian Communication Authority)
	Underwriters Laboratories (USA and Canada)
	MIC (South Korea)
	BSMI, Republic of Taiwan
	NOM (Mexican Official Normalization, Electronic Certification and Normalization)





# Index

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## A

A3cSi module	16-23	certification marks	B-13
AC power cord retaining bracket	5-6	dimensions	B-9
agency certifications	B-2	electromagnetic compatibility	B-8, B-9
airflow requirements	2-6	environmental requirements	B-13
Alpine		heat dissipation	B-10
console port	9-2	installing the chassis	7-11
Alpine 3802 switch		MAC address (Alpine 3808 switch)	7-4
auto mode	7-10	removing the chassis	7-15
certification marks	B-13	serial number	7-4
dimensions	B-9	Alpine 3808 switch rear view	7-3
electromagnetic compatibility	B-8, B-9	Alpine switch	
environmental requirements	B-13	components	6-3
extended mode	7-10	features	6-1
heat dissipation	B-10	grounding	7-15
LEDs	7-8	I/O modules	10-1
MAC address (Alpine 3802 switch)	7-9	power supply	6-5
rear view	7-9	Alpine switch port	
removing the chassis	7-15	connections	6-3
serial number	7-9	Alpine switch, general	
standard mode	7-10	checking the installation	8-2, 18-2
Alpine 3802 switch front view	7-6	port connections	6-3
Alpine 3804 switch		powering on	8-5, 18-2
certification marks	B-13	power-off specifications	B-10
dimensions	B-9	Alpine3804 switch	
electromagnetic compatibility	B-8, B-9	serial number	7-6
environmental requirements	B-13	Alpine3808 switch front view	7-1
heat dissipation	B-10	amperage, calculating	2-24
installing the chassis	7-11	ANSI standards	2-25
MAC address (Alpine 3804 switch)	7-6	ARM	16-19
rear view	7-6	auto mode, Alpine 3802 switch	7-10
removing the chassis	7-15		
Alpine 3804 switch front view	7-4		
Alpine 3808 switch			

---

## B

BlackDiamond 6808	
features	12-1

---

Extreme Networks Consolidated Hardware Guide

SummitPx1 switch	4-36
conventions	
notice icons	xx
text	xx

## D

DC cabling, Alpine	
attaching	8-11
selecting	8-7
DC cabling, BlackDiamond switch	
lugs	14-10
preparation	14-10
selecting	14-10
design standards	2-25
dimensions, Summit switch	B-2, B-5
dimensions, Summit24e2 switch	B-6
dimensions, Summit24e3 switch	B-7, B-8
DIMMs	
description	9-2, 15-4
installing	9-4
installing and	15-8
removing	9-5
removing and	15-9
distribution rack requirements	
grounding the rack	2-12
mechanical recommendations	2-12
securing the rack	2-13
service access	2-13
space requirements	2-13

## E

electrical codes	2-4
electromagnetic compatibility	B-3, B-5, B-6, B-7
electrostatic discharge	2-10, 2-11, 2-16
environmental requirements	2-5, B-13
ESD wrist strap	2-11
ESD, <i>See</i> electrostatic discharge	
extended mode, Alpine 3802 switch	7-10
Extreme Networks switches	
media distances, supported	1-7
media types, supported	1-7

## F

F32F module	16-13
F32Fi module	16-13
F48Ti module	16-8
F96Ti module	16-9
fan tray	
accessing in a BlackDiamond 6816 switch	13-3
installing in a BlackDiamond 6808 switch	17-4
installing in a BlackDiamond 6816 switch	17-4
installing in an Alpine 3808 switch	11-5
installing in an Alpine3804switch	11-5

removing from a BlackDiamond 6808 switch	17-2
removing from a BlackDiamond 6816 switch	17-2
removing from an Alpine 3804 switch	11-3
removing from an Alpine3808 switch	11-3
features, Alpine switch	6-1
features, BlackDiamond 6800 series switch	12-1
fiber optic cable	
bend radius	2-18
care	2-18
FM-24Fi module	10-11
FM-24Ti module	10-9
FM-32Ti module	10-8
FM-8Vi module	10-12
free-standing installation	5-4
full-duplex	1-2

## G

G12SXi module	16-4
G8Ti module	16-2
G8Xi module	16-3
GM-4Si module	10-5
GM-4Ti module	10-3
GM-4Xi module	10-4
GM-WDMi module	10-6
grounding	2-25
Alpine chassis	7-15
grounding the Alpine system	7-15
grounding the rack	2-12

## H

hardware address	4-5, 4-8, 4-14, 4-16, 4-21, 4-28, 4-33,
heat dissipation	B-3, B-5, B-6, B-10, B-11
helper bracket, installing a Summit switch	5-1
helper bracket, installing an Alpine switch	7-11
helper bracket, installing BlackDiamond switch	13-8
hot insert power supply (Summit48si switch)	4-19
humidity	2-10

## I

I/O modules, Alpine	
description	10-1
hot-swapping	10-19, 10-20
installing	10-19
LEDs	10-18
removing	10-20
I/O modules, Alpine Access	
LEDs	10-18
I/O modules, BlackDiamond	
description	16-1
hot-swapping	16-25, 16-26

installing	16-25
removing	16-26
I/O modules, BlackDiamond switch	
LEDs	16-24
industry standards	2-25
installation	
AC power supply (Alpine)	8-3
Alpine 3804 chassis	7-11
Alpine 3804 fan tray	11-5
Alpine 3808 chassis	7-11
Alpine 3808 fan tray	11-5
Alpine I/O modules	10-19
BlackDiamond 6808 chassis	13-8
BlackDiamond 6808 switch fan tray	17-4
BlackDiamond 6816 chassis	13-8
BlackDiamond 6816 switch fan tray	17-4
BlackDiamond I/O modules	16-25
BlackDiamond switch helper bracket	13-8
DC power supply (Alpine)	8-7
DIMMs	9-4, 15-8
helper bracket (Alpine switch)	7-11
helper bracket (Summit switch)	5-1
MSM64i modules	15-6
power supply (BlackDiamond switch)	14-5
remove AC power supply (Alpine)	8-5
remove DC power supply (Alpine)	8-11
remove power supply (BlackDiamond)	14-12
slave MSM64i	15-8
installation (Summit switch)	
free-standing	5-4
installing	5-6
installing cable	2-15, 2-16
bend radius	
fiber optic	2-18
UTP	2-16
cable distances	2-18
fiber optic cable	2-18
slack	2-16
IP settings, configuring	18-5

## L

labeling system for cables	2-15
LEDs	
110 VAC power supply	14-4
220 VAC power supply	14-3
-48 VDC power supply	14-5
Alpine 3802 switch	7-8
Alpine Access I/O modules	10-18
Alpine I/O modules	10-18
Alpine switch power supply	8-2
BlackDiamond switch I/O modules	16-24
MSM64i	15-5
SMMi	9-3
Summit24e2	4-31
Summit24e3	4-34
Summit4,Summit24,Summit48	4-29

SummitPx1	4-37
-----------	------

## M

MAC address	4-28, 7-4, 7-6, 7-9
MAC address (BlackDiamond 6808 switch)	13-7
MAC address (BlackDiamond 6816 switch)	13-5
MAC address (Summit1i switch)	4-5
MAC address (Summit24e3 switch)	4-33
MAC address (Summit4 switch, Summit24 switch, Summit48 switch)	4-28
MAC address (Summit48i switch)	4-16
MAC address (Summit48si switch)	4-21
MAC address (Summit5i switch)	4-8
MAC address (Summit7i switch)	4-14
MAC address (SummitPx1 switch)	4-37
management port	1-2
management port (Summit5i switch)	4-9
management port (Summit7i switch)	4-12
media types and distances	1-7, 2-18
memory, MSM64i	15-4
memory, SMMi	9-2
modem port	
SummitPx1	4-36
modem port (Summit7i switch)	4-12
MPLS module	16-21
MSM64i	
booting	15-3
console port	15-2
description	12-5, 15-1
installing DIMMs	15-8
LEDs	15-5
master, slave functionality	15-3
memory	15-4
ports	15-2
removing DIMMs	15-9
saving configuration	15-3
MSM64i modules	
installing	15-6
removing	15-10

## O

operating environment requirements	2-3
building codes	2-3
electrical codes	2-4
wiring closet	2-5

## P

P12cMi module	16-17
P12cSi module	16-17
P3cMi module	16-15
P3cSi module	16-15
plenum-rated cable	2-16
ports	

connections	12-3	redundant power supply port (Summit4 switch, Summit24 switch, Summit48 switch)	4-27
console port settings	18-3	related publications	xxi
MSM64i	15-2	removing	
SummitPx1 ports		DIMMs	15-9
management	4-35	reset button (Summit 4 switch, Summit24 switch, Summit 48 switch)	4-28
SummitPx1 switch Gigabit Ethernet	4-35	reset button (Summit1i switch)	4-5
power cord, replacing	2-23	reset button (Summit24e3 switch)	4-32
power requirements	2-22	reset button (Summit48i switch)	4-17
dual power supplies	2-23	reset button (Summit48si switch)	4-20
power cord	2-23	reset button (Summit51 switch)	4-9
power supply	2-22	reset button (Summit7i switch)	4-12
power socket	4-4, 4-13, 4-16, 4-19	RJ-21	
power socket (Summit4 switch, Summit24 switch, Summit48 switch)	4-27	connector	16-12
power socket (Summit51 switch)	4-8	pinouts	16-10, 16-11
power supply	4-4, 4-8, 4-13, 4-16, 4-19, 4-27	port	16-10, 16-11
110 VAC	14-3	RJ-45 cable	2-19
220 VAC	14-2	connector jackets	2-19
-48 VDC	14-4	running cable	2-15
power supply (Alpine switch)		bend radius	
LEDs	8-2	fiber optic	2-18
voltage	6-5	UTP	2-16
power supply (BlackDiamond switch)		cable distances	2-18
installing	14-5	fiber optic cable	2-18
LEDs	14-3, 14-4, 14-5	slack	2-16
power supply (BlackDiamond)			
removing	14-12		
power supply specifications	B-3, B-5, B-6		
power supply, AC (Alpine)			
installing	8-3		
removing	8-5		
power supply, DC (Alpine)			
installing	8-7		
removing	8-11		
powering on the Alpine switch	8-5, 18-2		
powering on the BlackDiamond switch	14-7, 18-2		
powering on the Summit switch	5-4, 18-1		
power-off specifications	B-4, B-5, B-10, B-12		
power-on self test (POST)	8-3, 14-12, 18-3		
<b>R</b>		<b>S</b>	
rack mounting the Summit switch	5-1	safety information	A-1
rack specifications		saving configuration	15-3
grounding	2-12	securing the rack	2-13
mechanical recommendations	2-12	serial port. <i>See</i> console port	
mounting holes	2-12	service access to the rack	2-13
securing to floor	2-13	show memory	3-5
space requirements	2-13	show switch command	7-11
rack-mounting		show version command	7-11
Alpine 3804 chassis	7-11	site planning process	2-2
Alpine 3808 chassis	7-11	size, Summit switch	B-2, B-5
BlackDiamond 6808 chassis	13-8	slave MSM64i	
BlackDiamond 6816 chassis	13-8	installing	15-8
radio frequency interference	2-16, 2-21	SMMi	
radio frequency interference, avoiding	2-21	console port	9-2
		installing DIMMs	9-4
		LEDs	9-3
		memory	9-2
		removing DIMMs	9-5
		SMMi modules	
		removing	9-5
		socket, power (Alpine 3802 switch)	7-9
		socket, power (Summit1i switch)	4-4
		socket, power (Summit24e2 switch)	4-30
		socket, power (Summit24e3 switch)	4-33
		socket, power (Summit4 switch, Summit24 switch, Summit48 switch)	4-27
		socket, power (Summit48i switch)	4-16
		socket, power (Summit48si switch)	4-19

socket, power (Summit5i switch)	4-8	reset button	4-28
socket, power (Summit7i switch)	4-13	serial number	4-27
socket, power (SummitPx1 switch)	4-36	size	B-5
space requirements for the rack	2-13	weight	B-5
standard mode, Alpine 3802 switch	7-10	Summit24e2 switch	
standards		certification marks	B-13
cabling	2-25	dimensions	B-6
commercial building	2-25	electromagnetic compatibility	B-6
grounding	2-25	environmental requirements	B-13
Summit switch port		front view	4-30
connections	3-5	heat dissipation	B-6
redundant power supply	4-27	LEDs	4-31
Summit switch, general		power socket	4-30
checking the installation	5-8, 18-2	power supply specifications	B-6
features	3-2	rear view	4-30
free-standing installation	5-4	weight	B-6
models	3-1, 4-1	Summit24e3 switch	
port connections	3-5	certification marks	B-13
powering on	5-4, 18-1	console port	4-32
rack mounting	5-1	dimensions	B-7, B-8
stacking with other devices	5-4	electromagnetic compatibility	B-7
Summit1i switch		environmental requirements	B-13
agency certifications	B-2	front view	4-32
certification marks	B-13	LEDs	4-34
console port location	4-4	MAC address	4-33
dimensions	B-2	mini-GBIC support	4-32
electromagnetic compatibility	B-3	power socket	4-33
environmental requirements	B-13	rear view	4-33
front view	4-3	reset button	4-32
GBIC support	4-4	serial number	4-33
heat dissipation	B-3	weight	B-7, B-8
LEDs	4-22	Summit4 switch	
MAC address	4-5	certification marks	B-13
port configurations	4-3	console port	4-27
power supply	4-4	dimensions	B-5
power supply specifications	B-3	electromagnetic compatibility	B-5
power-off specifications	B-4	environmental requirements	B-13
rear view	4-4	front view	4-23
reset button	4-5	heat dissipation	B-5
serial number	4-5	LEDs	4-29
size	B-2	MAC address	4-28
weight	B-2	power supply	4-27
Summit24 switch		power supply specifications	B-5
certification marks	B-13	rear view	4-27
console port	4-27	redundant power supply port	4-27
dimensions	B-5	reset button	4-28
electromagnetic compatibility	B-5	serial number	4-27
environmental requirements	B-13	size	B-5
front view	4-25	weight	B-5
heat dissipation	B-5	Summit4/FX switch	
LEDs	4-29	front view	4-24
MAC address	4-28	Summit48 switch	
power supply	4-27	certification marks	B-13
power supply specifications	B-5	console port	4-27
power-off specifications	B-5	dimensions	B-5
rear view	4-27	electromagnetic compatibility	B-5
redundant power supply port	4-27	environmental requirements	B-13

---

Index - vii

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## U

uninstalling	
Alpine 3802 chassis	7-15
Alpine 3808 chassis	7-15
Alpine3804 chassis	7-15
BlackDiamond 6808 chassis	13-11
BlackDiamond 6816 chassis	13-11
uninterruptable power supply	
calculating amperage requirements	2-24
features	2-23
selecting	2-24
transition time	2-24
UPS, <i>See</i> uninterruptable power supply	

---

## W

WDMi module	16-6
weight, Summit switch	B-2, B-5
weight, Summit24e2 switch	B-6
weight, Summit24e3 switch	B-7, B-8
wiring closet	
airflow requirements	2-6
BlackDiamond 6816 switch installation	2-6
electrostatic discharge	2-10
floor coverings	2-5
grounding	2-5
humidity	2-10
temperature	2-5
wiring terminals	2-12
WM-1T3i module	10-17
WM-4Ti module	10-15